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MARCH 1957

Skyways

FOR BUSINESS

OFFICIAL PUBLICATION OF NATIONAL BUSINESS AIRCRAFT ASSOCIATION

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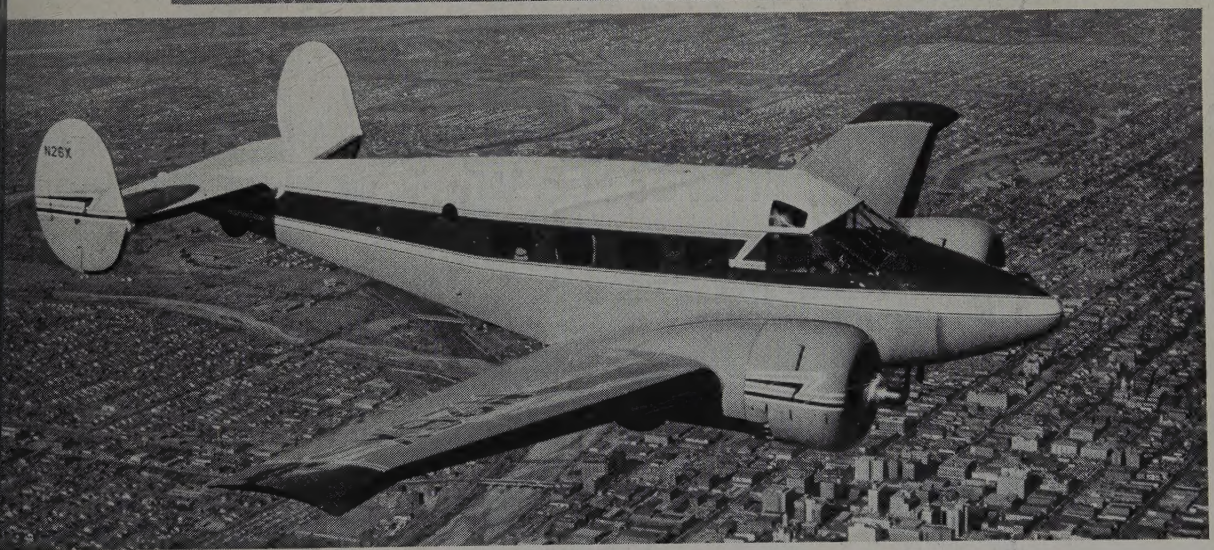

E50 Twin Bonanza

Super 18 Executive

H35 Bonanza

- ROUND TABLE: The Medical and Physical Aspects of Safety in Flight
- HIGH DENSITY SAFETY By Capt. J. G. Bush
- MAINTENANCE: Lycoming Panel

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Philip Van Treuren

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MARCH, 1957

Skyways FOR BUSINESS

The official publication of the National Business Aircraft Association

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FOUNDED BY J. FRED HENRY, 1942

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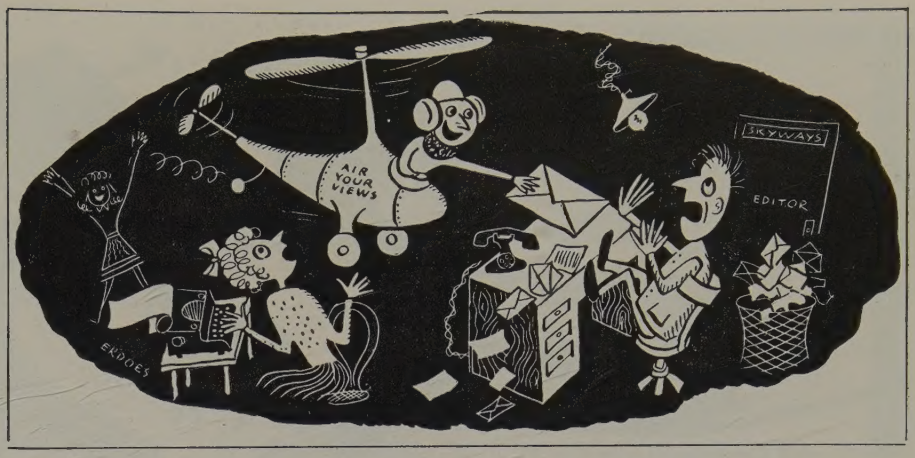


AIR YOUR VIEWS

SKYWAYS
122 East 42nd Street
New York, N. Y.
Attention: Lois Henry
Dear Mrs. Henry:

As usual, I enjoyed reading your December issue of SKYWAYS. I do wish, however, that someone would tell Miss Pat Walker, "Miss Business Aviation of 1956," that dead props are not good for anyone to lean against, particularly when their specifications read 34-22-36.

Sincerely yours,
KENNETH H. MUNROE
Captain, USAF

Dear Editor,

I'm just sitting here at the airport hoping the boss won't call and want to go some place even worse—in a hurry as usual.

Anyway, I was just leafing through a well-thumbed copy of SKYWAYS in the pilot's lounge and I thought I might ask the Editor this one: Why don't tower operators ever take a breath long enough to identify themselves? Not just busy fields but comparatively slow ones too! One of the ships I have to fly has a crystal-controlled transceiver, so it isn't just my tuning.

The other day, at an airport in the Pennsy foothills, where I go so often I know the frequencies better than my girl friend's telephone number (so I don't look it up every time I go there!), I spent over five frustrating minutes yelling myself blue in the face trying to get an answer from the tower. During this period, I listened "5 by 5" to a tower giving out instructions almost without a break and never an identification. Finally a plane with simplex equipment called on the frequency, identifying an airport almost 75 miles away, in his original call-up. I went to radio (Insac) then and found out the towers had swapped frequencies a week or two before. I got an answer this time the first call.

Sure, it was in the AirGuide, but do you look up *your* girl friend's address every time you go to see her?

Keep up the good work—I like the professional flavor to all your stuff. Like the airline pilots' magazine, you talk our language but tuned to the non-airline pilot's frequency!

Very truly yours,
George

SKYWAYS
Dear Sirs:

In your SKYWAYS January issue there was an article *Cross Wind Landing Gears* by J. H. Geisse. On page 6, 2nd paragraph of the 2nd column, I would like to know the name of the one popular tail-wheel plane that has over 50% of all serious accidents, and the one popular nose wheel plane that has over 28% of all serious accidents in cross wind landings.

We have only a north and south runway here, 5000 ft., asphalt. We do have plenty of east and west wind. If you feel that you do not wish to answer the above questions, please tell me where I may write to obtain this information.

Would you please have Mr. Geisse send me literature and costs on the Geisse cross wind gear for the Cessna 170 and Super Beech E18.

Thank you very much.

Sincerely,
John B. McKee

Dear Editor:

I would like to put forth an idea that has occurred to me as a means of increasing the conspicuousness of aircraft in flight during VFR weather, particularly in areas of high density traffic. The thought is to produce an artificial contrail or smoke trail, probably in a series of puffs rather than as one long trail. This idea was broached first to some local operators who seem to think there is some merit in it. Several senior airline pilots as well as a vice president and operations manager of one of the airlines have all commented favorably on the idea; although some of them raise the question as to the technical aspect of how it could be accomplished with a minimum of expense and weight.

It is my hope that the idea might have sufficient merit that it would prove to be an interim safety measure until the electronics industry can solve the problem of proximity warning and collision avoidance. It is believed that if sufficient interest is indicated by a broad cross-section of the flying industry through response to requests for comments some one or several people will undertake the necessary research and development work to solve the technical problems and come up with a usable device. Anything that can be done through NBAA as a medium of communications with the business transport segment of the industry should be helpful.

It might be well to mention that this idea of improving the conspicuousness of aircraft is one that is used for visual tracking of small drone aircraft that are radio controlled from either a flight or a ground station.

H. P. Henning, Operations Manager
Air Transport Section
General Motors Corporation

Mr. Ralph Piper
Chief Pilot
Monsanto Chemical Company
St. Louis, Missouri
Dear Mr. Piper:

I have just finished reading the text of your speech in the December issue of Skyways Magazine which was delivered at the NATA Meeting and wish to congratulate you for making such a speech to the Industry.

Every executive pilot has had the problems that you brought out in your address, but few have had the opportunity to "lay it on the line" to the many people who are responsible in one way or another for this lack of service that we find in so many of the airports in the United States today.

It is doubtful that company business will bring us to St. Louis; however, should you have occasion to come to San Antonio would certainly like to have the pleasure of meeting you.

Very truly yours,
PHILLIPS DRILLING CORPORATION

Richard H. Downing
Chief Pilot

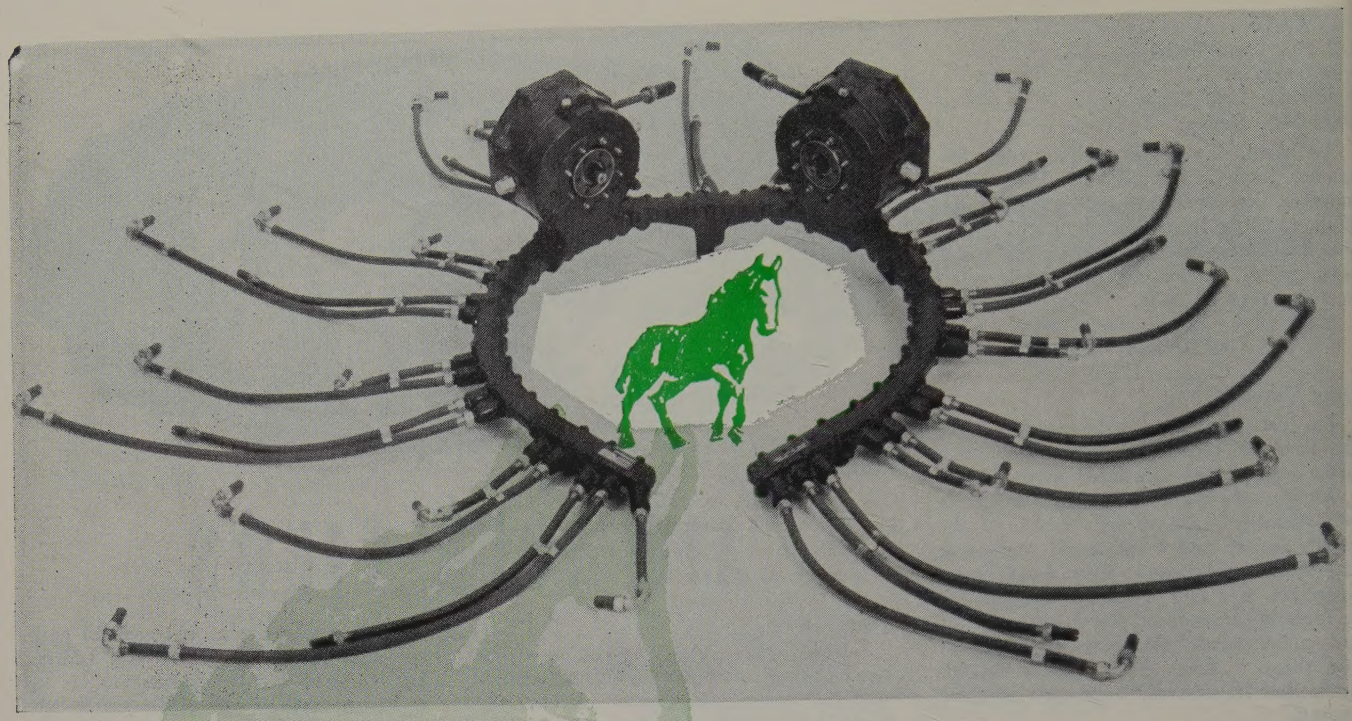
National Business Aircraft Assn., Inc.
1425 13th St., N.W.
Washington, D. C.
Gentlemen:

Recently a large corporation held a three-day business meeting of company officials in Williamsburg, Va. (16 miles from this airport). No doubt this meeting had been planned several months before; but, not until the company's four aircraft began delivering officials to Patrick Henry Airport from all over the nation on a round the clock basis did I even hear that such traffic should be anticipated. We had problems of ground transportation, aircraft parking, aircraft refueling, and overtime personnel dumped in our lap without any prior notice. I later learned that everything had been beautifully coordinated between the company and the Williamsburg Hotels, but it had all been kept a secret from the poor middle man, the airport manager.

Just a smattering of liaison between that company's management personnel, their pilots, and my office could have smoothed an otherwise hectic three days for all concerned. In a smaller way, single aircraft arrivals, coordinated with my office, could make for very harmonious operations at this field.

Frequently there are chauffeurs or company officials in our terminal who ask me for ETA's on private aircraft. None of these people know the aircraft number or type and occasionally, not even the point of departure. I like to go out of my way to provide whatever help I can for the

(*Continued on page* 48)



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HOT TIPS
from Janitrol Joe

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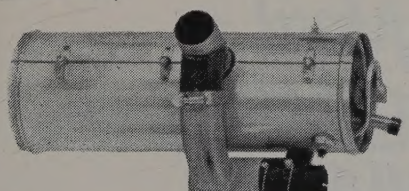
TIP TO MOD CENTERS: You can practically throw away the slide rule when it comes to installing Janitrol heating equipment for utility aircraft . . . just look in the new *Janitrol Equipment and Installation Guide.* It's a 58-page book giving complete catalog dope on how to pick the right heater, where to put it, how to hook it up, and how to get best results. There are tips for installing Janitrol heaters almost anywhere—nose, belly, nacelle, tail, you name it. The book's free. Ask for it on your letterhead today!



TIP TO OPERATORS: If you own a four-to-six-place plane, look into the Janitrol S-25 heater. It produces 25,000 BTU/hr, and measures a compact 6" in diameter, 16½" long, only weighs 13 pounds. Operation can be manual or automatic, as you prefer. And . . . it uses only one gallon of fuel every 3 hours at full rating!

TIP TO OWNERS, PILOTS, MOD CENTERS: Keep up to date on the newest in aircraft heating and system installation . . . write for your FREE subscription to "Aircraft Heating Digest."

Cordially,

Joe

Janitrol Aircraft-Automotive Division
Surface Combustion Corporation
Columbus 16, Ohio

now hear this...

Louis J. Fulop is new mgr. of De-Icer and Rivnut sales of B. F. Goodrich Aviation Prods. Div. **Glenn A. Zimmerman** is mgr. of new products sales; **Carl J. Tsaloff** is new Akron plant mgr.

B. William Lalush has the new post of Sales & Service Rep. of Eclipse-Pioneer Div. of Bendix.

Pat Lynch is new Asst. Sls. Mgr. for Aero-Coupling Corp., Burbank, Cal.

A. Melnichak is new member of Air Travel Dept. of Associated Aviation Underwriters.

V. L. (Hook) Gaston is new Manager of Super 18 sales for the commercial sales dept. of Beech Aircraft Corp., Wichita. **Steve Howbert** is new Manager of sales for the Beech Bonanza, and **Marvin B. Small** is new Manager of Beech Twin-Bonanza sales.

Harold E. Francis was appointed Asst. Chief Engineer for Accessories, Controls, Fuels and Lubricants, Wright Div. of Curtiss-Wright Corp. **George A. Daum** is new Manager of Commercial Sales at the Wright Div.

B. L. Whelan, V-P of United Aircraft Corp., was elected Chairman of the Helicopter Council of AIA for 1957, succeeding **Don R. Berlin,** President of Vertol Corp. **J. E. Leonard,** Mgr. of Cessna's Helicopter Div., was reelected Vice Chairman.

Alan L. Morse, Chief of Aircraft Div. at CAA Tech. Development Center, received the first "Frontiers of Flight" trophy, presented by Gov. Theo. McKeldin for the Maryland State Aviation Commission. Morse helped develop the bird-resistant windshield.

Carl G. Holschuh was appointed President and Gen. Mgr. of Sperry Gyroscope Div. after retirement of **Charles M. Green. Dr. Carl A. Frische** was appointed Executive V-P.

Edward Keightley, aviation sales mgr. of Union Oil Co. of Cal. was elected 1957 Chairman of Aviation Advisory Committee of American Petroleum Ind. Comm. **J. H. Craddock,** av. sls. mgr. of Humble Oil is new vice chairman. Advisory Committee conducts studies on elimination of taxes of aviation fuel.

Lewis F. Millett was appointed to head Radar Development Dept. of Research Lab. Div. of Bendix Av. Corp. **Robert G. Hoof** is new mgr. Electromechanical Ops. at Pacific Div.

C. J. (Jack) Reese, President of Continental Motors Corp. was elected 1957 Chairman of AIA Utility Airplane Council.

Francis Hine, President of Airwork Corp., was elected Distributor V-P at 28th Ann. Meeting of ADMA.

COMPANIES

Lopez-Grace Aviation, Fla. Beech dealer, has moved from Miami to the new Broward Internat'l Airport, Ft. Lauderdale.

Field Aviation Co., Ltd. is new Canadian distributor for Rusco seat belts and hardware and for Dayton Aircraft Products.

Airwork Corp.'s Cleveland branch office has been appointed Bendix-Scintilla distributor for Indiana, Kentucky, Michigan and Ohio.

PROVEN beyond QUESTION

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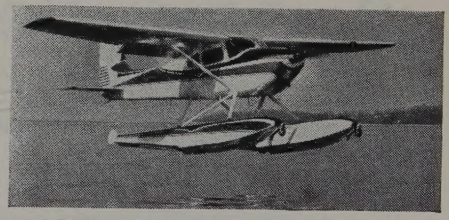
Nearly one hundred sets of Edo Amphibious Floats are in daily use around the world, piling up proof of their stamina, providing their owners with untold utility.

On rough gravel strips north of the Arctic Circle, in scheduled airline operations in the Northwest, speeding oil drilling operations in Louisiana and South America...aircraft with Edo Amphibious Floats are proving beyond question the advantages of such flexibility of operation and the ruggedness of Edo's thoroughly proven amphibious gear.



Edo Amphibious Floats are approved for the Cessna 180, the deHavilland Beaver and Otter with only a slight sacrifice in payload and performance—far outweighed by increased utility. Other approvals are pending.

Why not investigate how the ability to land at will on airport or water will increase the utility or revenue possibilities of your flight operations? Send for Edo Float brochure.

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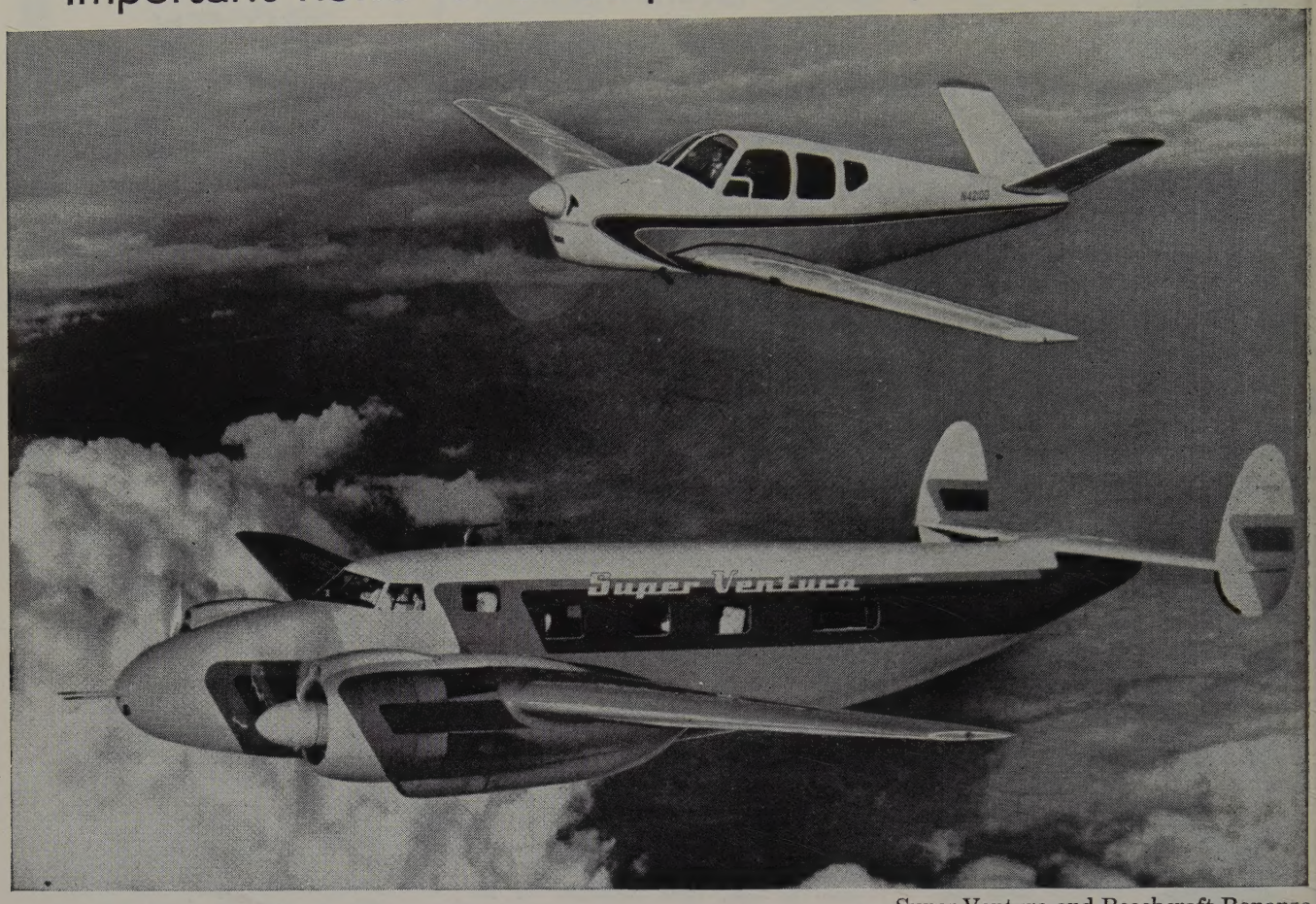

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A new development for **all** types of aircraft engines

Here's a new detergent-type oil *for all types of aircraft engines*—whether they're horizontally opposed, inline or radial! It keeps all kinds of aircraft engines cleaner than was ever possible before with non-detergent oils . . . *without* developing any undesirable side effects.

The secret? New Gulfpride Aviation Series D combines Gulf's exclusive Alchlor Refining with a remarkable new "detergent additive."

Cleaner engines

Experience in all kinds of service proves New Series D greatly *reduces carbon, coke and varnish collection* around rings and valve stems. *Eliminates harmful deposits* in the combustion chambers.

More hours between overhauls

New Series D offers you an unusually tough lubrication film, too. *Cuts down wear on engine parts substantially.* The result? Far lower *operating* and *maintenance* costs! Safer *engine performance!* Why not try it and see for yourself?

New

GULFPRIDE AVIATION SERIES D

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AVIATION PRODUCTS

Editorial

BUSINESS EVALUATES THE JET

In the field of jet aircraft the United States Air Force is the Messiah-Prophet and Wright Air Development Center at Dayton, Ohio, is its Mecca.

For all who would woo and win the jet, the trip to Mecca is a must. NBAA has been there.

Lt. General Thomas S. Power, Commander USAF Air Research and Development Command, invited NBAA to sponsor for its members a two day "Jet Know-How Symposium." The Symposium was held on February 7 and 8, 1957, at WADC, Dayton. One hundred fifty-two representatives of American industry using business aircraft were on hand. "Socked-in" airports from St. Louis to Pittsburgh and from Detroit to the Gulf left many pre-registrants stranded. Of the one hundred fifty-two persistent ones who succeeded in getting through, some came part way by air, thence by rental cars, by trains, and even, it is suspected, a few of them by dog sleds. But Mecca was worth all the trials and rigors of the journey.

It is sincerely doubted that there is any place on earth which can compare with WADC in its capability to pack so much jet know-how into two short days. That know-how was straight from the shoulder. There were no frills, no pulling of punches, and certainly no attempt to ice the cake. The experts of WADC drew beads on the cream of the crop of civil flyers and let them have both barrels of cold facts. It was assumed that business flyers knew the advantages that might be derived from operating jets and no time was lost in recounting those advantages. The entire program was directed to a discussion of jet *problems.*

From introductory and welcoming remarks by Brigadier General Hougan on through discussions of Gas Turbine Propulsion; Thrust Augmentation; Reverse Thrust Techniques and Drag Devices; Jet Fuels and Oils; Fuel System Design and Fuel Management Techniques; Operating Experience with Turbo-Jet Engines; Foreign Object Damage to Jet Aircraft; Ground Electrical Power Support; Multi-Purpose Servicing Units; Air Field Design; Jet Aircraft Noise Problems; The Physiological Aspects of High Altitude Flying; Flight Control, Stability and Control Characteristics; Automatic Flight Control Systems; Traffic Control and Navigational Systems for the Jet Aircraft Age; Jet Aircraft Navigation and Traffic Control; General Flight Characteristics of Jet Aircraft; to the final subject, Flight Planning and Cruise Control, there was no question left but that there is a price to pay for the high performance of jets. That price is not only money; it includes adequate implementation, thorough knowledge, relentless maintenance, and careful ground and flight preparation.

The Symposium clearly showed that jet problems are soluble but that the jet airplane is unforgiving of carelessness and lack of knowledge.

A few of the NBAA registrants (and one member of the Press) came out of the two-day meeting expressing the thought that jet flying was entirely too complicated and too exacting. Most of those in attendance, however, concluded that the briefing was challenging and that the complications and the exactness of jet flying were no more awakening to the propeller boys than would be a briefing on instrument flying at 200 and ½ to a student pilot who had never been under the hood.

There can be no question but that the Jet Age is here. Months ago WADC flew the last of its propeller jobs off its runway. The airlines are committed to the jet. The evolution of progress marches on. Those who look upon the jet today with fear and trepidation are no different from many members of the medical profession who, in 1900, thought that a forty-mile-an-hour speed in an automobile would be fatal to human beings. That opinion didn't stop America from putting 50 million vehicles on her highways and byways. And scare thinking today will not stop the jet.

American industrial corporations having need for long range, fast transportation will embrace the jet and will undoubtedly find it an improved tool superbly designed to meet those requirements. It should be remembered that the airlines will use propeller aircraft for its feeder and short range schedules through the foreseeable future. It is not contemplated that all the scheduled airline flights will be served with jets even fifteen years from now.

Many corporations will likewise conclude that jets, at this time, are operationally and economically feasible only for long hauls where altitude flight is necessary for required speed.

It is hoped that every corporate aircraft owner who contemplates the use of jets had a representative make the trip to Mecca. Those who did not and those who may later decide to buy a jet and did not have a representative at the Dayton Symposium, should contact NBAA National Headquarters and arrange to benefit from all that was learned on February 7 and 8.

Finally, the Air Force and WADC are to be congratulated for a two day briefing of inestimable value to American corporations contemplating the use of jets. Arrangements were perfect, the program clicked right on the dot, and every officer and specialist assigned to the handling of a subject was clearly an expert in his field.

On behalf of its members, NBAA expresses deep appreciation to the Air Force for a job well done.

NBAA Director's Notes

"Unusual" proposals for aviation legislation continue to appear in the Congressional hopper. Latest, and second time introduced, would bar single and twin-engined aircraft from LaGuardia, Idlewild and Newark unless ceiling was *1200 feet*. With more than two engines ceiling can go all the way down to *600 feet*. Same Congressman (Bosch, R-NY) would bar all commercial jet operations from airports in or partially within cities over one million population.

Rep. Bosch's election district lies between Idlewild and LaGuardia. Same bills never got past committee hearings last Congress session. Same forecast for this session's action.

* * * * *

Washington National Airport restricted only to scheduled airlines . . . that's the suggestion made by Senator Spessard Holland (D-Fla.) to CAA Administrator, Jim Pyle.

This "gem" came forth during Senate sub-committee on Appropriations hearing regarding 7-year-old project to get funds for Burke (Va.) airport which would relieve congested Washington National.

At moment Senator Holland made this suggestion, there were 42 transient business aircraft at Washington National. Detailed listing of these aircraft, and their corporation owners were sent to Senator Holland as part of NBAA's immediate and vigorous rebuttal. Air Transport Association officials emphatically denied they sponsored such "thinking."

* * * * *

Future Airworthiness Directives (AD Notes) will be reviewed by NBAA well in advance of CAA issuance. Result of past NBAA action regarding AD notes that would have grounded R-985 engine users. Now NBAA will check application of proposed AD Notes and their possible effect on aircraft owners.

* * * * *

Mailings for January: Special Report—"A LOOK AHEAD FOR 1957"; Report to "ALL OWNERS of LIMITED LICENSE (NL) Aircraft"; "HOW TO OBTAIN YOUR TAX REFUNDS AND EXEMPTIONS—FROM MOTOR FUEL TAXES ON AVIATION FUEL."

Your Executive Director has been invited to attend the 5th Annual ALPA Air Safety Forum, Chicago, Mar. 14.

* * * * *

Evolutionary, not revolutionary . . . will be Curtis Plan for airway traffic control. Use tools at hand, stimulate research, quickly adapt new tools when proven will be theme of report—judging from recent talks made by Presidential Assistant Edward P. Curtis, charged with planning aviation's requirements for next 20 years.

* * * * *

Budgetary approval by Congress of CAA requests seems likely. Only small cuts as opposed to ripping slashes of previous years. Past history shows CAA got only about 30% of monies requested for traffic control and navigation aids. Grand Canyon accident spurred additional funds.

Congressional approval needs every NBAA members' support if air traffic control problems are to be resolved.

* * * * *

Training areas for military aircraft taking up too much of nation's air space?

Question under survey and discussion in Washington.

Proposed airways extensions being blocked by military's desires to extend or create new blocks of restricted airspace.

* * * * *

Independent CAA bill as proposed by Senator Mike Monroney (D-Okla.) does not go far enough in reorganization. Top-level aviation planners believe more extensive revision is needed. Encompassing greater fields the new agency might include present Air Coordinating Committee functions dealing with air space use, airport use, tall towers restrictions.

* * * * *

Columbia Geneva Steel Lodestar accident near Tyrone, Pa., still under investigation by CAB. *Preliminary* investigation shows (1) No explosion in the air; (2) No fire on board prior to impact; (3) No problem with weight and balance.

Investigation centering on engine icing conditions.

NOTE: this is a preliminary report and intensive investigation may reveal totally unexpected cause.

Suite 344

During January, Suite 344 has had the pleasure of hearing from many of its members.

"Chuck" McKinnon, Mgr., Flight Operations, I.B.M., visited Headquarters on Jan. 21. Chuck, along with your Executive Director and family, Mrs. Lawton, Bob and Jean, Dick Groux and wife, "Rusty", Kathy and "C. M.," had ring side seats for the Inaugural Parade. Your Headquarters overlook part of the famous Pennsylvania Ave.

Chuck is making plans for a New York Regional Forum in the near future.

Jim Magnus, Minneapolis Honeywell Regulator Co., is very much interested in setting up a Minnesota Regional Forum in the near future. Jim is Pres. of the Minnesota Business Aircraft Assn., with Jim Grogan, Pillsbury Mills, Vice Pres., and Bud Mitchell, Minneapolis Star & Tribune, Secy.-Treas. They, too, have Chairmen and Asst. Chairmen for their 6 committees—Flight Operations; Legislation; Meetings and Forum; Public Relations; Technical Evaluation and Industrial Relations, and approximately 45 members.

R. E. Johnson, AT&T Co., met at Headquarters with representatives of NBAA (William K. Lawton, Dick Groux); NASAO (Col. A. B. McMullen); AOPA (Max Karant) to discuss progress being made with respect to the proposed public-air-ground radio stations at Chicago and Detroit.

Your Executive Director was invited to a meeting of the business aircraft operators in the Harrisburg, Pa., area held on February 14 in the CAA Examination Room. Buril Barclay, CAA Aviation Safety Specialist, Washington, D. C., who is on special assignment for business aircraft operation evaluation, gave a general discussion of proposed CAA policies and regulations for business aircraft.

NBAA's Dick Groux has been busy attending Air Space Panel and Airport Use Panel meetings. Watch for NBAA's progress on such matters.

We welcome your visits—Bud Lyons and Wells Forbes, Scott Paper Co.; Frank Mara and Baker Bradenbaugh, U. S. Aviation Underwriters; our own Exec. Vice Pres., Joseph B. Burns, the Fuller Brush Co. Mr. Burns also met with the Hon. Louis Rothschild, Under Secretary of Transportation, while in Wash.; George C. Prill, Convair; Arnold Johnson, Americo; Henry Schiebel and L. A. Swirbul, Grumman Aircraft Engrg.; and the many phone calls are welcome, too—Stan Smith, N. Y. Wire Cloth Co.; Hal Henning, GMC (see letters column for Hal's suggestion); Bob Northington, Piedmont Aviation; Charles E. Maynard, Union Carbide & Carbon Corp.; P. A. Fleury, Aramco; Don Corey, Equipment Mfg. Co.; Ed Rice, Aerojet-General Corp.; Bill Vance, Rollins, Burdick Hunter; Walt Pague, Armco Steel; Col. Roscoe Turner, Roscoe Turner Aeronautical Corp., and many others.

NBAA welcomes more new members, among its hundreds of others: Dudley Mach. Corp., Santa Clara, Cal., Robert G. Dudley, Pres., NBAA Rep.; Equipment Mfg. Co., Detroit, Mich., Don L. Corey, Chief Pilot and NBAA Rep.; C. N. Flagg & Co. Meriden, Conn., Peter Flagg, Pres., NBAA Rep.; Lukens Steel Co. Coatesville, Pa., William F. Austin, Chief Pilot, NBAA Rep.; the Upjohn Co., Kalamazoo, Mich., Joe P. Betty, Chief Pilot, NBAA Rep.; Vickers Inc., Detroit, Mich., Donald Nelson, Chief Pilot NBAA Rep.—all Regular Members. PacAero Engrg. Corp., Santa Monica, Cal., Elmer R. Easton, Contract Mgr., NBAA Rep.; Zelair Corp., Defiance, Ohio, Edward C. Buhrer, Asst. Mgr., NBAA Rep.—both Associate Members.

Address all correspondence relative to membership requirements and Association business to National Business Aircraft Assn., 344 Pennsylvania Bldg., Wash. 4, D. C., or call NA 8-0804.

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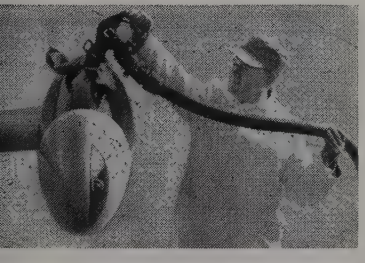

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High Density Safety

By Captain J. G. Bush

In the few months just past, the onslaught of full winter weather has revealed a circumstance new in the history of commercial aviation. Following as it did on the heels of the inevitable let-down in the general hysteria following the freak collision over the Grand Canyon, only a few persons have publicly noted the significant fact that the usual "bad weather season" slump in air traffic has been conspicuous by its absence!

Although outstanding representatives of the various branches of the flying public and industry, as well as government, have been ceaselessly seeking a universally acceptable solution to the congestion hazard, none has yet been found. Raging controversies between groups competing for the same air space, civil versus military, airline versus private pilots, professional versus non-prof. has found allies changing sides faster than international politics.

"Look and be seen" has been tossed about as a catchword to be thrust at the other fellow. Radar proximity indicators have replaced as a greater white hope the previous year's emphasis on hi-intensity lighting systems visible in daylight. Now, the CAA's Technical Development Center at Indianapolis is investigating the eye-catching value of iridescent, high-reflective paint.

Although the current winter soon ending has seen little change in air traffic congestion, the situation can only worsen during the coming spring and summer. Until positive progress is made in both technical development and regulatory research to alleviate the problem, the pilot concerned with the safety of himself and his passengers can only look to improvement of operational techniques.

Enroute, the oft-repeated recommendations of adherence to quadrantal altitudes is frequently invalidated by the increase in one-way airways with IFR-minded pilots hiding ostrich-like behind ATC clearances in CAVU weather. It is a self-evident fact that ATC can only protect a minute percentage of the airborne traffic on any good day from like-minded traffic. This diminutive advantage is often far outweighed by the unacceptable delay inherent. In VFR flight it would appear that a combination of adherence to preferential IFR airway routings and altitudes plus the long overdue development of rear-vision mirrors is the most hopeful present-day solution. The hair-curling sensation at the back of one's neck on the busy Washington-New York airway is most indicative of this need. Use of hi-intensity flashing light systems, highly-reflective paint and the old-fashioned swivel neck, especially in enroute visibility of five miles and less are musts.

Hi-density terminal areas are receiving at least their full share of attention from industry and government experts. Not all the proposed solutions are happy ones to all proponents. From the afore-mentioned extreme of the professional aerial hack-driver who wants everybody on an IFR plan (his company insists *he* fly one anyway) to the extremes of the equally professional lobbyist for the "little fellow" pilot,

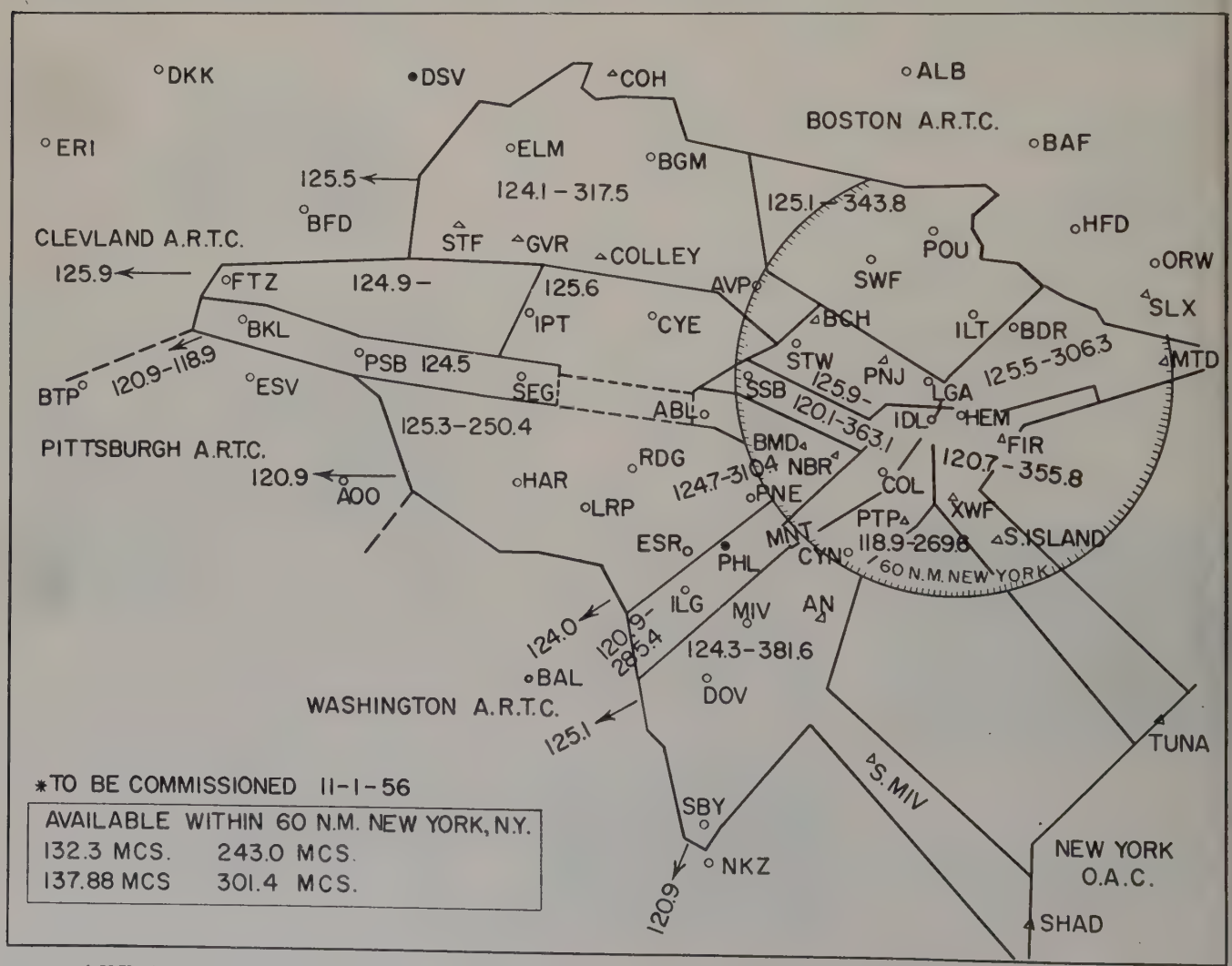


CHART *of N.Y. Center Area Frequency Coverage is typical of hi-density terminal and enroute control frequency distribution designed for IFR plan use, but also useful for traffic information and more efficient flight planning enroute to terminal area.*

who sees nothing wrong with the standards good enough in Lindy's day, is a long, long way.

ATC people, strangely unlike other bureaucratic agencies, resist strongly the suggestion that the solution lies in their taking over the control of VFR traffic in hi-density areas. Closest to the problem, they are only too aware of the limitations of the human machine as demonstrated daily at any very high density terminal airport where runway and landing delays in CAVU not infrequently surpass many IFR days! "Just too d---- many airplanes" as one harassed tower man exploded in reply to an official query as to a complaint of excessive delay!

Various systems and techniques, born of necessity and experience, have been developed to lubricate the overloaded machinery at ATC. A thorough understanding and cooperation of the pilot can go a long way to expedite and safeguard his passage at these times.

Inbound to a hi-density terminal area, the technique of IFR simulation pays dividends in added safety. Conceding right away that marginal or close-to-IFR flight conditions demands at least the protection of an ATC clearance, the practice of either checking in or monitoring Center area frequencies for the purpose of picking up traffic and quick-changing weather information in VFR as well as marginal conditions puts little strain on either the airplane's generator or the ATC controller who may often be a progressive trainee who can use the practice in good weather. These frequencies are easily available, if not known, from the nearest enroute airways station.

Closer in, most busy terminal airports are fast adopting the practice of requesting that the initial radio call be made a good ways out and on the appropriate Approach Control frequency. This relieves a busy tower runway controller of the real burden of endlessly repeating basic wind, altimeter and runway information and leaving him free to concentrate on the vital problem of close-in traffic sequencing and separation. Also if any delay is being incurred by a congestion of more aircraft than the runway can safely handle, the Approach Controller, who is least burdened in VFR weather can accomplish the necessary delay away from the airport vicinity and thus avoid the dangerous aspect of an overloaded traffic pattern.

It goes without saying that at the first hint of congestion delay, it is a good time to ease back on the throttle and slow up. The old Army practice of "hurry up and wait!" never made sense so reduction of airspeed entering a busy terminal area is both sensible and economical. As a bonus it significantly reduces the collision hazard by materially increasing the recognition and diversion time.

Once in the airport pattern, close attention to sequence and flight path adjustment is a must. Here again early preparation further out such as reduced airspeed and pre-landing check completion, will free the pilot to concentrate on safe maneuvering in accordance with traffic control instructions. Some of the "hairiest" situations result from pilots losing track of the aircraft ahead and overtaking, letting down or converging in a blind spot on the other ship.

Pre-occupation with other details would seem to be the only explanation for an experienced pilot who overhauls a slower aircraft in the pattern ahead of him, creating a dangerous situation on final, or at best additional delay by having to pull up, go around and rejoin the landing sequence at the tail end!

Speed and flight path adjustment on base and final at request of the tower operator to accomplish and maintain a desired interval over the fence, may seem arbitrary or annoying to the pilot accustomed to the easy, easy tempo of low-density airports, but it has become a vital cooperation needed of pilots to obtain maximum utilization of terminal airport runways.

With the spread of community consciousness, preferential runway designations have increased the incidence of cross-wind operation by leaps and bounds. As every cloud has its silver lining, so does this otherwise annoying development. Within reasonable limits, conservatively set after investigation by a cross-section of the flying fraternity, the safe maximum cross-wind components for most commonly used aircraft frequenting hi-density airports have been approximated assuming average or better skill. Within or below those limits, pilots can expect assignment of a "preferential" runway. ("Into-the-wind" runway requests are invariably honored albeit at a price of some delay to other traffic).

The payoff to the use of a somewhat crosswind runway in heavy traffic is of course, the virtual elimination of the deadly prop-wash and wing-vortex turbulence of previous aircraft. As the velocity of the crosswind increases, so does the assurance of fresh, undisturbed air on the approach and over the runway. This factor, making closer intervals between aircraft and less delay both for landing and takeoff, is another bonus to experienced and skillfull pilots.

In the same vein, dawdling on the runway after touch-down puts an extra burden on the controller and on the following pilot, seriously curtailing the runway's acceptance rate. No reckless or wild maneuvers are necessary but a pilot who spots his landing and clears the runway in minimum safe time obviously identifies himself as a professional.

There are many ways a pilot can facilitate his own handling at hi-density terminal airports. Many experienced pilots monitor inbound approach information and indicate so on first contact, relieving the frequency of time-consuming repetition. Use of landing lights on entering the area adds safety and eases traffic handling at night.

Regulations designed to limit the authority of an ATC towerman or Center controller often prevent him suggesting to a pilot a procedure variation which will expedite safely within the pilot's judgment. Long delays at takeoff due to primary runway lineups or localized visibility conditions can often be resolved by the pilot volunteering an accepted alternate runaway subject ATC approval. The pilot best knows his limitations and that of his aircraft.

Supplementary services available within the ATC framework for VFR conditions, subject only to the traffic load, include traffic advisories, controlled climbs to an on-top condition within reasonable limits, radar vectoring around suspected heavy rainstorm and turbulance, and spotting of other traffic. In this latter regard, it should be understood that both small aircraft and distant aircraft at low altitudes are frequently as invisible to the radar controller as they are to the pilot in low visibility marginal conditions. Barring ATC instructions to the contrary, and especially in terminal areas where a number of small uncontrolled satellite fields are located, it would appear to be good judgment to avoid the lower altitudes until reasonably close-in with or without radar assistance.

Use of these and other techniques borne of experience and good judgment, will add to the safety of any flight in and out of any hi-density area, through or over. For instance, thorough knowledge of the geographical and altitude patterns of such an area, plus some judicious aural snooping on the appropriate frequencies may pay dividends for you as it did for a corporation DC-3 pilot a few weeks ago.

Flying *over* a well-known hi-density terminal area at better than 2,000 feet on top of a dense smoke layer, he eavesdropped on a Center clearance to a fast-climbing turboprop airliner going to 21,000 ft. Familiar with the terminal area pattern and realizing he was in just the right position to be "in the sun" for the other pilot, he poured the coal to his bird and started climbing. He had just gained about a thousand additional feet of airspace beneath him when the Viscount busted out of the smoke top and passed right under him. As closely as he could figure, the other ship went right through the exact point in space he would have occupied within seconds after emerging from the smoke top! As far as was known, the other pilot never even knew of the close call, yet both were entirely legal!

A point which is often overlooked in the hustle and bustle of high density cockpit activities is the vertical blind spot factor. Sure, we occasionally prod ourselves mentally and S-turn on a climb to scan the immediate area hidden by the raised nose attitude, but how often do we take the time to "clear" ourselves both directly above and below?

Several mid-air collisions and many near-collisions have been recorded where a faster aircraft climbed up into a slower one cruising, both in each other's vertical blindspot. Similarly it is quite easy to push over even at reduced throttle and let right down on an aircraft below, in his blindspot!

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

The Medical and Physical Aspects of Safety in Flight

Representatives of aviation and aviation medicine discuss the physical health of pilots, and how it contributes to safe flight operations. Opinions differ on the nature and severity of the problem. Here are some typical comments on the situation:

{At press time, a government subsidized survey is in progress to review and modernize physical standards for pilot certification.}

- **"We haven't had nearly as much research in the human problems for civil aviation as for military aviation, and there are many vital differences in the problems."**
- **"The pilots during World War II maintained a physical fitness status which is being lost today in military and civil aviation."**
- **"The average pilot is not aware of what things like drinking or smoking will do to him when he flies."**
- **"We live in a faster age, and man has been able to adapt himself to it to a very large degree."**
- **"Proper instruction is more important than physical condition."**
- **"It seems to me that the medical requirements could be more lenient than they are, but that there should be some psychiatry in the medical examination for flight."**
- **"The CAA examiner is a specialist. He is an added safety factor for the pilot as an individual and for the public at large."**
- **"Medical examiners are out to see that pilots keep flying. We try to advise them preventively, and we warn them ahead of time if we see things starting to add up the wrong way."**

Dr. Thomas C. Gentry, Moderator *(Regional Flight Surgeon, CAA): "The subject of this SKYWAYS Round Table, medical and physical safety in flight, has become increasingly important with the widespread use of aircraft. Dr. Raymond, will you begin by describing for us the nature of the physical problems in safe flight?"*

Dr. Louis F. Raymond *(ATR Medical Examiner, CAA):* "Jet aircraft have been ordered by Continental Can Company. The usual speed of military jets is 900 miles an hour. No one is sure Continental Can jets will go that fast, but at 900 miles an hour you are traveling at 1841 feet per second. If an airplane coming in the opposite direction is making the same speed, that's going 3682 feet a second, which is about 2/3 of a mile. The average normal alert person takes one second to perceive and recognize any object, and by the time the pilot can recognize another aircraft the aircraft is already in the cockpit, and by the time he has corrected any reaction of the aircraft, the other aircraft is already over a mile past the pilot.

"This only serves to illustrate one point: that our engineers are giving us machines which are faster than most humans are equipped to cope with. I think perhaps the Government has already outlined a program to prevent such incidents by keeping these fast aircraft up above a certain level. But another factor, which the whole flying public should be interested in, is to know what our physical and mental limitations are as pilots."

Dr. Gentry: *"Mr. Hunsaker, do you have a comment?"*

Owen Hunsaker *(Public Relations, United Airlines):* "Dr. Raymond's remarks have anticipated some of the questions I wanted to ask, but I would like to know if such things as radar, and instruments like the proximity warning indicator, will tend to counterbalance this increase in physical requirements resulting from speed? Specifically, will the increase in the mechanical ability of the aircraft be paralleled by an increase in the requirements on the human body, or will the physical requirements for pilots be just about the same?"

Dr. Gentry: *"That is something we hope will be true. Technical improvements having been perfected to the point where we can control flight safely at supersonic speeds. This is a really fundamental consideration, and I think the answers will be brought out as we go along. The plane that Dr. Raymond mentioned is very fast. The majority of the planes flying in America today, certainly corporate and private flying, are a long way from reaching that point. Speeds up to two or three hundred miles an hour are what we must think about at the moment. In the military services, where they have a lot of jet aircraft, they are already faced with these problems, but it will be several years, in my opinion, before we need to be alarmed about supersonic speed problems. Many people will continue to fly in conventional piston-type aircraft, and that is the problem which calls for our attention now."*

Dr. Raymond: "I think Dr. Gentry is quite right. I introduced the point only to show the analogy between human reaction time and advanced engineering. We can make airplanes go faster, we can build houses faster, but it still takes nine months to have a baby. The fact is that humans have their limitations.

"I understand from Mr. Brown that Continental Can has ordered several jets for 1958, or something like that."

Steve Brown *(Chief Pilot, Continental Can Co.):* "We have ordered the M-185 from Fairchild, but we won't have them before 1960."

Dr. Raymond: "Nineteen-sixty; so that's not a problem now. What we have to do now is to enlighten the public on human reactions as they concern present aircraft. Our technological advancement is very high, but in coping with many situations we still must rely on the man in the cockpit to solve them.

"I thought perhaps Mr. Hunsaker might show us, from his knowledge of commercial and business aviation how far the public may be mistaken in their belief that the scheduled airlines do most of the flying."

Hunsaker: "I heard some figures on that just recently. I was amazed to learn that, in the United States, there are approximately 65,000 corporate and privately owned aircraft in operation at present, compared with only 1700 commercial aircraft operating today.

"Now, my question is this: is the average human being of today physiologically the same, better or worse than, for example, the average individual 50 years ago, that is, at the beginning of the age of flight? Since flight has progressed, how has the human developed physiologically?"

Dr. Gentry: *"Generally speaking, I would say that our generation is better adapted to flying, because we grew up riding bicycles and motorcycles, playing baseball, things in which we learned to judge distances and higher speeds. We have much more such experience than people had 50 years ago.*

"As an illustration, consider that, even ten years ago, we didn't know what would happen to an airplane and its pilot in passing through the sonic barrier. I remember attending a meeting of the Queens County Medical Society, less than ten years ago, at which very capable and well-informed research workers from the Navy talked about what would happen to the person flying a plane when it broke the sound barrier. We knew that airplanes, at that time, would begin to vibrate and show all the danger symptoms of disintegration when they reached a certain speed, namely, between four and five hundred miles per hour. As for the pilot, we didn't know his blood would boil, or his eyes pop out of his head, when he flew a plane at that speed.

"Today we know a lot more about that. Bell's experimental X-2 recently reached a speed of over 1900 miles per hour, and, I believe, reached an altitude of 126,000 feet. Ten years ago, an altitude of 40,000 feet in a heavier-than-air craft was extraordinary. I remember that a friend of mine, Dr. Randy Lovelace, was decorated because he jumped from a plane at 40,000 feet over Wright-Patterson Field. He had two oxygen bottles and two parachutes on, and made certain recordings on himself, such as pulserate, etc., as he came down. At that time we didn't have airplanes in commercial use that would fly over 225 miles per hour. Today we have turbo-prop planes, like the Viscount, that almost double that speed, and we know that pilots can go through the sonic barrier safely. The question of what happens to the passengers when these planes fly at higher altitude and lose their pressurization is the sixty-four dollar question, particularly because they are not healthy young adults like the men in the military services, but marginal cases, such as elderly people whose vascular system will not stand much strain, patients going to and from a medical center, anemic people or those with high blood pressure and hardening of the arteries, who cannot tolerate an altitude of 20,000 feet without a serious vascular accident.

"We have greatly improved on pressurization. You remember that the first commercial pressurized planes in 1945, 1946 and 1947 would frequently blow the astrodome or lose pressurization through a window. I remember that once, on a DC-6, in 1947, a fat, heavy man leaned against a window and pressurization was lost through the window, slowly enough, fortunately, so that we got down without any trouble. Those things still happen; an incident was described only last month by Dr. Ross McFarland, who was returning from Europe to attend a post-graduate course in aviation medicine at Ohio State University. The plane that he was on lost its pressurization over the ocean.

"These are the things that I think ought to be brought out now. The question of safety in our present planes, as well as the question of integrating the first jets with the slower flying conventional piston type planes, and what physical requirements will be made on the people engaged in private or corporate flying: these are definitely problems that face us today. Even a situation like landing a Cessna or a Beech at the same airport with a Viscount traveling at two or three times the speed of the smaller plane presents a problem.

"Of course, we have to depend a lot on such technological safety devices like the airborne collision warning and proximity indicators. These are very valuable, but they must be more fully perfected as the speed of planes increases and we have jets flying all over the country. These are problems that need

ROUND TABLE PARTICIPANTS *(standing, l to r): Steve Brown, Pilot, Continental Can Co.; William Lightbowne, Technician, Bell Telephone Laboratories; Al Winter, Civil and Military Flight Instructor; Dr. Louis F. Raymond, CAA Medical Examiner; (seated, l to r): Arnold Rosenberg, President, Arnold Rosenberg, Inc.; Dr. C. J. Kraissl, CAA Medical Examiner; Dr. Thomas C. Gentry, Moderator, CAA Medical Examiner; William F. Placek, CAA Safety Agent; Owen Hunsacker, United A.L.*

ROUND TABLE PARTICPANTS

THOMAS C. GENTRY, M.D., Moderator, Regional Flight Surgeon, CAA Region I, has been Flight Surgeon since 1931. A retired Colonel, U.S. Army, he served as Medical Director for Gen. Chenault's Civil Air Transport in the Far East, was Medical Director for American Airlines, Chief Surgeon for Flying Tigers and 14th Air Force in China during World War II.

STEVE BROWN, Chief Pilot for Continental Can Co., served with ATC in the CBI theater during World War II, subsequently joined Continental and organized its Aviation Department.

OWEN O. HUNSAKER, School and College Consultant, United Air Lines, is engaged in promoting the acceptance of aviation through industry-sponsored education aids.

C. J. KRAISSL, M.D., is ATR Medical Examiner for CAA, and Senior Flight Surgeon for the Air National Guard. A member of The Aero Medical Assn. and a Diplomat for the American Board of Aviation Medicine.

WILLIAM M. LIGHTBOWNE, member of the technical staff at Bell Telephone Labs, has flown about 1000 hours; Commercial rating 1952; is active in Morristown (N.J.) Flying Club.

WILLIAM F. PLACEK, Aviation Safety Agent, CAA, holds ATR Airman Certificate with all ratings authorized. With CAA since 1943, he served previously with Eastern Airlines, Sikorsky, and Fokker in Teterboro, N.J.

LOUIS F. RAYMOND, M.D., is ATR Medical Examiner for CAA and Aviation Medicine Consultant for United Air Lines. Owns and flies a Navion.

ARNOLD ROSENBERG, President of Arnold Rosenberg, Inc., served previously with Bendix Radio Div., General Precision Equipment and Bloomingdale Rubber Co.

ALBERT M. WINTER, Instrument Instructor at Morristown (N.J.) Airport and Ground School Instructor at Morristown and other New Jersey airports, was a bomber pilot for the 8th Air Force during World War II, and flew for ATC.

a great deal of study. I would like to say this: We haven't had nearly as much research in the human problems for civil aviation *as in* military aviation. *At a place like Wright-Patterson Aero Medical Center, they have spent millions on the problem. This was essential because of its relation to the national defense. We haven't begun to do anything like that for civil aviation, and there are many vital differences in the problems of civil and military aviation."*

Dr. Raymond: "I think that's a good point. I think that civil aviation medicine is just beginning to feel its wings. I believe Ohio State University has started a small division for research as it applies to civil aviation medicine, which of course includes business aviation and the business flier. That is really the present problem. Military research usually leads the way, and we follow, but our problems are different. A pilot who flies for the Air Force is at his prime; a business pilot doesn't have to be that good, but this is something that civil aviation medicine would like to determine. But they need help, and they have to educate the public to the fact that they need funds. Civil aviation medicine needs help because it applies to more people than either military or commercial flying, as Mr. Hunsaker pointed out."

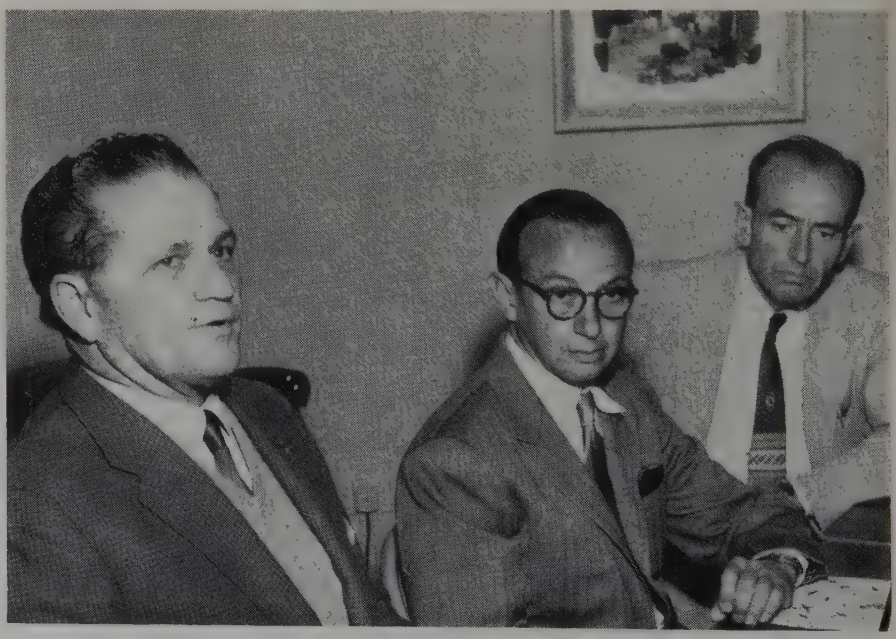
Dr. Gentry: *"Perhaps one of our corporation pilots could describe some of his problems. Steve Brown, would you care to comment?"*

Brown: "Our problems are few, and appear to be of a natural order, caused by increasing age of the captains. With regard to Dr. Gentry and Dr. Raymond's discussion of the pilot's health, I personally think that all humans are probably in better health today than they were 30 years ago. I'd like to hear a doctor's viewpoint, or the result of a doctor's having seen some statistics on this point."

Dr. C. J. Kraissl *(Medical Examiner, CAA):* "I don't know what things were like in the early days of flying. However, I have seen the *esprit de corps* of the young pilots who were eager to get in during World War II, develop tremendously physically and go through rigorous training programs, and maintain a physical fitness status which is being lost today, not only in military service, but also in civil aviation. So many of our pilots 'go into training' when they come in for a physical examination, and yet they completely disregard the point of paramount importance, which is to be in top physical condition while they are flying airplanes. I think there has been a degeneration in the average pilot. They aren't as careful about their habits.

"Take, for instance, the matter of drinking. If one should take a drink prior to a flight during World War II, he was automatically grounded if his commanding officer knew about it; and I dare say there are a number of pilots who have no hesitancy about taking one

(*Continued on page* 32)



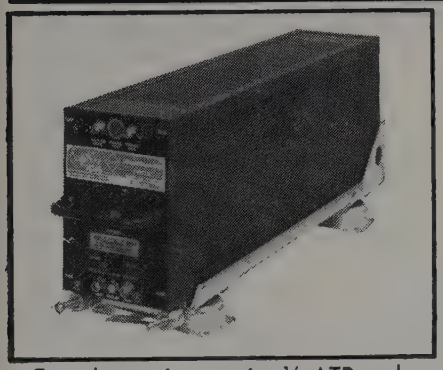
DR. GENTRY *(1) remarked on the importance of emotional stability in pilots, and added that some psychological factors can be spotted by an efficient medical examiner even in a routine physical. Arnold Rosenberg (center) asked how reliable such an evaluation could be, and Dr. Kraissl (r) replied by saying that if the proper rapport exists between doctors and flight instructors, many apparently psychological problems can be explained by a doctor who is sufficiently familiar with the pilot's characteristics.*

announcing . . . for airline and executive aircraft use

THE Sapphire 1016

90-360 CHANNEL VHF TRANSMITTER

90-560 CHANNEL VHF RECEIVER



Complete unit occupies ½ ATR rack, weighs 24¾ pounds. Unitized construction permits quick separation of transmitter, receiver and power supply units for easy servicing.

Narco introduced its airline-quality Sapphire line of navigation and communications equipment with the Narco DME...Now comes the Sapphire 1016 VHF communications unit designed to meet the maximum channel requirements for airline and executive aircraft use.

The Sapphire 1016 includes a high-powered transmitter of 90 to 360 channel capacity. It has a crystal-controlled receiver of 90 to 560 channel capacity with precisely defined 50 kc channel separation available throughout the entire range from 108 to 135.95 megacycles.

The Sapphire 1016 meets latest CAA TSO requirements for airline use. While its performance and channel capacity match the finest airline-type equipment available, the 1016 is offered at only a fraction of the cost of comparable equipment. See your Narco dealer or write for full details.

narco NATIONAL AERONAUTICAL CORP.
AMBLER, PENNA.

SAC'S FIVE YEAR PLAN

$4 Million in new buildings, $1.5 Million in new tools and equipment — in its 25th Anniversary year, Southwest Airmotive looks forward to the forthcoming Jet Age.

This is the 25th anniversary year of Southwest Airmotive Co. Behind it is a colorful quarter-century closely parallel in development with the growth of business aviation, linked inseparably with the legends of Love Field; and its future, viewed in terms of SAC's unequalled facilities for jet engine overhaul, and the $4 million Five Year Plan of new construction, is anticipated as the brightest and busiest in company history.

In July, 1955, SAC made history by turning out the industry's first major overhaul on a jet engine ever performed by a non-military, non-manufacturing facility. This achievement came 150 days after receipt of the first USAF jet engine contract, calling for the overhaul of about 1200 J-33's and accessories for approximately $3 million. In those 150 days, SAC spent $1.5 million in equipment, in building test cells and other specialized structures, and in training key personnel.

Since that time, SAC has been on schedule every month with the Air Force, and has received a second contract comparable in size and amount to the first.

In November 1956, SAC received from the U.S. Navy the first contract it had awarded to a non-manufacturer since World War II for the overhaul of any type of powerplant, this one for the overhaul and modification of J33-A-16 jets.

At the end of 1956 SAC remained the industry's only jet overhaul plant of its type, and stood ready for business and commercial aviation's jet engine and accessory requirements.

A large part of the overall Five Year Plan is devoted to expanding the jet overhaul facilities, with the addition of 6600 sq. ft. to the main engine plant, and the paving of a unique concrete grid for the outside storage of jet engine cans. Comprising 11 concrete ramps, the grid provides for the storage and mechanical handling of about 1200 canned J-33 engines. Each 20′ wide, the ramps are connected to a taxiway for easy access with fork-lift trucks. An additional 2368 sq. ft. of office and stockroom space for the jet engine test building was scheduled for completion in February.

With more than $1,500,000 worth of jet tooling and equipment, and over a year and a half of experience in jet engine overhaul, SAC is the only such company in the U.S. qualified to court overhaul contracts from the airlines, and will be ready to meet the needs of business aviation's first jet pilots.

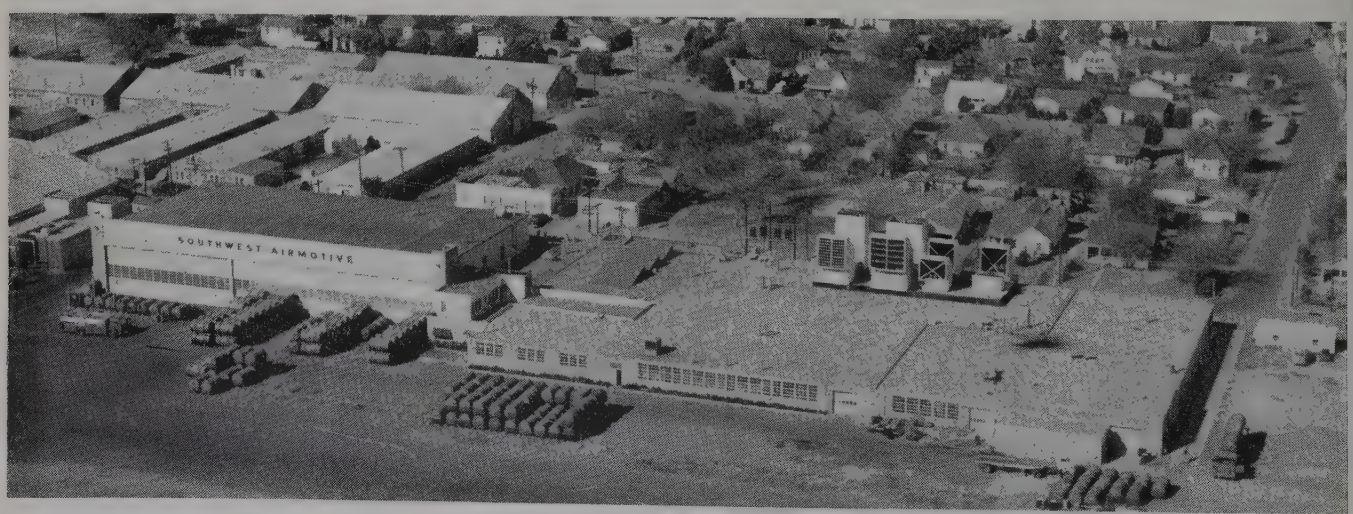
Under the same roof, separated at some stations and combined at others, are SAC's facilities for the overhaul of piston engines. Prior to phasing-out USAF contract overhauls on piston engines, between June 1950 and fall 1955 SAC rebuilt approximately 6000 military powerplants of eight different types. SAC reports that the jet program has improved, rather than detracted from its services for piston-engine overhaul for business, private and airline customers, since many new items of equipment have been acquired which are suited to both types. Among its piston engine customers SAC numbers an air-frame manufacturer who uses SAC exclusively on its new-production planes.

Although the engine division, a 100,000 sq. ft. plant at the north side of Love Field, continues overhauling piston engines for business and private pilots all over the Western Hemisphere, and complete 7 jet overhauls daily for the Air Force, the first half of the Five Year Plan is making great changes on a 35-acre site on the opposite side of the field.

Necessitated by the construction of a new air terminal by the city of Dallas, SAC's exodus began spectacularly with the removal of a 50,000 sq. ft. hangar to a new site where, rebuilt and enlarged at an expense of $350,000, it forms the nucleus of a great 5-section building 800′ x 160′. First additions to this building will be a second hangar, 400′ x 80′, and a luxurious, air-conditioned two-story terminal and flight operations unit, both to be completed by late summer 1957.

Completion of these projects will represent an investment of $2 million. The remaining $2 million will provide for construction of a two-story distributor-sales and general office building, and additional hangars, one large enough to accommodate DC-8 size aircraft.

From 20,000 sq. ft. of floor space in 1932, when it was founded by Edward F. (Doc) Booth, SAC has grown to nearly 300,000 in 1957; from zero volume to approximately $8 million; from a half dozen employees to more than 500. Because it was right, 25 years ago, in its pioneering instinct about the value of Business Aviation to the national economy, Southwest Airmotive Corporation is fully prepared to meet the service requirements of the up-and-coming Business Jet Age.



THE ENGINE DIVISION *of Southwest Airmotive Co., for nearly 25 years the home of blueribbon overhauls for corporate and private owners, and now the nation's only privately operated jet-overhaul facility, is located in this 100,000 sq. ft. building at Love Field, Dallas. It is unaffected by moves being made by other company divisions in SAC'S $4,000,000 Five Year Plan.*

SAC'S *claim to being Business Flying's busiest crossroads is substantiated by this scene taken during a recent petroleum industry convention. SAC's big "welcome mat" has at times accommodated as many as 275 planes, a majority being multi-engine.*

General News

SKYWAYS feels that the following, received by Torch Lewis from D. S. Malmberg, Goodrich Aviation Products, will be of interest to our readers.

During the Radome Discussion Panel at the most recent NBAA meeting, an opinion was expressed that ice build-up on radomes was not detrimental to radar transmission. NACA Report RM E52J31 states that ice formations were found to produce serious effects on radar performance. The report states serious loss in transmission efficiency can result after only short icing exposures. Further, all the results of the test indicate that ice thickness and radome geometry are the prime factors effecting the transmission of radar through an iced radome. Air speed, temperature and type of ice are of second-order importance.

The Naval Air Test Center at Patuxent River, Maryland is evaluating a B. F. Goodrich Pneumatic Nose Radome De-Icer for ice removal efficiency and the results are written up in Proj. TED No. PTR EL 41089. This report concludes that during flights under the prevailing flight conditions, the radome boot successfully prevented the accumulation of ice on the radome.

With reference to transmission losses attributed to flat sections of radome De-Icers, small loss is paid for ice protection of this sort. In addition, the readings for radar waves protected by a radome De-Icer remain more constant during all-weather conditions.

At present we are building radome De-Icers for the Lockheed 1049G nose, the WV2 and RC121C Nose Upper and Lower Radome and the *Learstar*. Because of the complicity of fabrication and expensive tooling involved, special configurations are not practical for Pneumatic De-Icer protection. However as commercial radomes become more standard for various types of executive aircraft, Pneumatic de-icing becomes a real and favorable possibility for ice protection.

Not only does the De-Icer protect the radome in icing conditions, but it is an unparalleled abrasion and erosion cap for all types of aircraft.

Continental Aviation Expands Facilities for Turbine Production

A new plant opened by Continental Aviation and Engineering Corp. in Toledo, Ohio, marks the growing importance of gas turbines in aviation. When CAE first entered the field 5 years ago the only engines in this country were foreign built. Today, CAE's backlog is not only large, but they anticipate that requirements for future production will continue to increase.

CAE, a subsidiary of Continental Motors, has home base at the San Fernando Airport, Van Nuys, Cal. They develop and manufacture a number of small jet engines, gas turbine shaft engines, turbo prop engines, gas turbine compressors, and various special purpose piston engines. Current use of some of these engines: the Cessna T-37 Air Force twin jet trainer, Temco TT-1 Navy jet trainer, turbine powered helicopters built by Sikorsky and Bell, and gas turbine compressor carts for starting large jet engines.

CAE is also investigating solid-fuel ram-jet engines, and is working with No-Fog Corp., in the development of equipment for airport fog dispersal. Aircraft Marine Engineering Corp. is developing an executive, high-performance amphibian using Continental ducted fans to obtain high utility in a modern STOL aircraft.

"Bus" Busenkell, Executive Engineer, of CAE West Coast operations, uses a Bonanza for business calls to military bases and aircraft companies in the western area. He estimates that the use of business aircraft permits twice as many business calls as would be possible in any other way. Continental is so proud of the service they can provide for their customers with a business plane that they regard executive flying not only more economical of management's time, but a business necessity.

November Production and Export Statistics for Business Aviation

Shipment during Nov. 1956 of 410 1- to 10-place executive and utility aircraft by 6 U.S. aircraft manufacturers has been announced by Joseph Geuting, Mgr., Utility Aircraft Council, AIA.

Included in the shipments were 349 planes of 4-place or more, and 61 1- and 2-place aircraft, with a total dollar value of $6,835,000 figured at the manufacturers' net billing price. Shipments in October were slightly higher, totaling 440 aircraft valued at $7,725,000.

In the January-November total of complete aircraft, Cessna led the way with 1379 172's; runner up was Piper, with 1070 Pacers and Tri-Pacers.

According to Irving H. Taylor, AIA's Export Director, exports of civil aircraft weighing 6000 lb. or less during Nov. 1956 amounted to 87 units valued at $971,170. The unit shipments during Nov. represented an increase of 52.6% over Nov. of the previous year, and an increase of 94.2% in value. The aircraft were sold by 5 manufacturers to 23 foreign countries.

During the January-November period of 1956, total shipments amounted to 861 aircraft valued at $11,018,979. Total exports for civil aircraft of this class for the same period in 1955 amounted to 595 aircraft valued at $7,288,883.

Of the Nov. exports, the greatest number of units (32) went to France. Fourteen units were shipped to Argentina, 7 to New Zealand, 5 to Burma.

Shipment and/or export statistics were supplied by: Aero Design & Engrg., Beech Aircraft Corp.; Call Air; Cessna Aircraft Co.; Mooney Aircraft, Inc.; Piper Aircraft Corp.; and Taylorcraft, Inc.

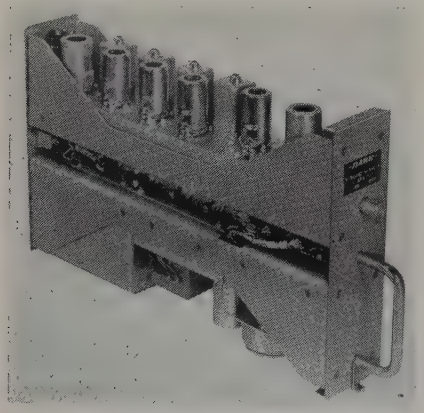
navicom

Transistorized Power For Glide Slope Cuts Weight

ILS glide slope's greatest value lies in getting a fast, heavy airplane safely down on a localizer course to an altitude from which a landing can be accomplished without over-running the available runway. Light aircraft, such as commonly used by businessmen pilots ordinarily cannot afford the weight penalty and rely on their sensitive altimeter, using the localizer alone and adhering to ADF or circling minimums as a rule.

A welcome step forward therefore is the new Dare Glide Slope Receiver, featuring a transistor power supply in place of the usual dynamotor or vibrator. The new unit, weighing only 6-¾ pounds fits the short ¼ ATR rack. Up to 20 crystal channels are selected by a Ledex Rotary Solenoid, controlled by an Instrument Panel Switch.

The new transistor power supply replaces the usual power units with an all-electronic means of converting the aircraft battery current to alternating current. Two Dare transistors operating as a multivibrator circuit produce an alternating current with ample power.



The Dare Model DGS-20 provides a sensitive highly selective circuit for use with as many as 3 indicators at a time. Supplied with 10 crystals to cover all present channels, an additional 10 crystals may be used to cover future requirements. Modular design has been employed to simplify servicing.

Dare has also announced a new, lightweight aircraft marker beacon receiver in which dynamotors, vibrators and relays have been eliminated. The unit, weighing only 4½ pounds fits the short ¼ ATR rack.

60-Channel Transceiver Sparks New VHF Line

Appropriately named *The Executive* "60", a new transceiver announced by Wright Airborne Electronics, Kansas City, Mo., will sell for less than $600. A long-range communications unit of multi-channel construction with strong output, it incorporates crystal-controlled reception as well as transmission, while holding weight to a negligible factor. The new Wright unit is dynamotor-powered. The planned price will include all crystals, antenna, power supply and cables.

President Gary Wright pointed out that the circuit design of *The Executive* "60" eliminates many trouble spots formerly found in VHF equipment. Also, the use of crystal-saver circuits enables the set to give 60 channels of transmission and reception with the use of only 22 crystals. "Since the receiver

is also crystal-controlled, there is no 'hunting' needed, no squealing crystal tuners; just select the desired frequency and the set is locked on. The dynamotor power supply insures a dependable, stable source of power at all times," he explained.

Also available now is an all-new Localizer Adapter, the WLA-10, which can be added to your present VHF receiver. Coming out soon is an ILS package; a light-weight, low-cost ADF; a light-weight, three-light marker beacon receiver, dynamotor powered; and many others.

Flush Mounted 75 MC Beacon Antenna

Marker beacon antennas for some time have been designed to replace the obsolete exposed wire type antenna of pre-war days, the Model AT-134 announced by TELECTRO INDUSTRIES CORP. is installed by flush mounting it on the bottom of an airplane fuselage.

The external arrangement of the Model AT-134 is a flanged deep drawn aluminum alloy cage forming the antenna cavity, with the slotted shaft of the variable loading capacitor extending through the closed top of the case to permit screwdriver adjustment and tuning. The flanged bottom, or airplane surface side of the antenna, as furnished, is open. On the short sides of the cavity are the receptacle for the connection of the lead-in, and an 18 MM threaded hole. The hole may be closed by a plug, but it is intended to be used for antenna dehydration. This may be accomplished either by screwing into the hole an 18 MM sparkplug type dehydrator, or by connecting to a remote dehydrator, or by connecting to a remote dehydrator system.

The internal arrangement of the Model AT-134 includes a shunt-fed

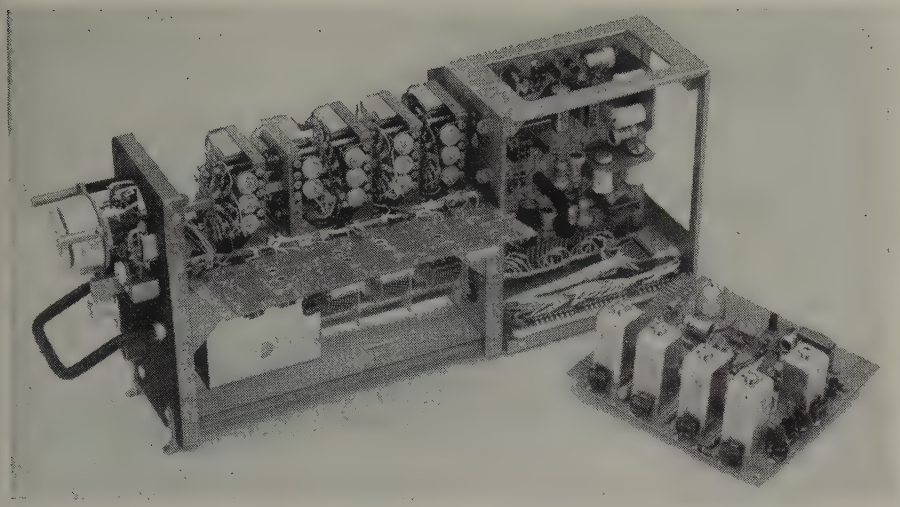
bent-channel receiving element, top loaded by a small variable capacitor in parallel with a 25 MMF temperature compensated fixed capacitor.

The Model AT-134 measures 11¾ inches long by 7¾ inches wide by 3¼ inches high.

All-Transistor ADF Heads New Lear Line

In two significant advances, Lear Radio Inc. has once again taken a lead in the very important ADF field. Believed to be the first all-transistor ADF to be offered to the aircraft industry, the Lear ADF-100 will be available shortly after the first of the year. The system includes a console-type control head, a ⅜ ATR sized shock-mounted receiver, a Lear Ferro dynamic loop antenna pressure sealed against dust and including an integral dehydration capsule. The hermetically sealed azimuth indicator is synchro-actuated. The ADF-100 is airline-type equipment.

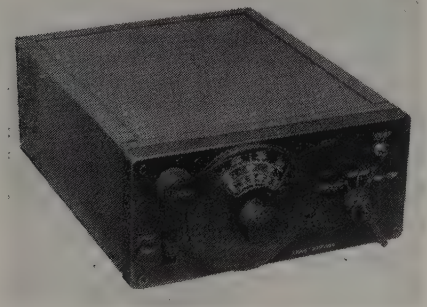
The Lear ADF-100 provides for continuous frequency coverage over three bands: 190-405 kc, 400-850 kc, and 800-1705 kc. The edge-lighted remote control head is engineered for optimum simplicity with a tuning control, volume control, function selector switch, CW switch, and a two-speed manual loop rotation switch. The ADF-100 is capable of providing calibration accuracy of *better* than 0.75%. The compact receiver unit contains the electronic circuits in which transistors and etched circuitry are employed. The two amplifier boards are constructed as individual plug-in modules, readily accessible for



inspection and removable for maintenance.

The ADF-100 operates directly from a 28 volt DC source; no additional power supply is required. Power consumption is 0.30 amperes; *less than one-tenth* that of ADF's that employ vacuum tubes. Since the unit operates instantly when the power switch is turned on, *no warm-up time* is required.

The other Lear advance is in the very popular small business plane ADF. The Lear ADF-12E can be *continuously* tuned through three bands: 190-440 kc, 420-900 kc, and 850-1750 kc. The tuner, which mounts on the instrument panel, also features a new type full-reading illuminated dial. An "ADF test circuit", which enables the pilot to check the operation of the ADF at any time, is an added new feature. A beat frequency oscillator is available as accessory equipment. The complete ADF-12E system, which consists of the tuner, amplifier,



electric driven loop, and the indicator, weighs *less than 18 lbs.* It is available for 12 or 24 volt electrical systems.

Like its predecessors, the ADF-12E is a combined automatic direction finder, a broadcast receiver, and a radio range and communications receiver, and has provisions for furnishing modulation and power for the Lear Model RT-10E VHF transmitter.

Midway Radio Procedure

The men at Chicago Midway Tower say that because Ground Control is not always familiar with traffic being handled by airborne controller on active runways, landing aircraft should remain in contact with Airborne Frequency (118.7) until they are advised to change to Ground Control by the tower.

Experimental World Aeronautical Chart

The Subcommittee on Aeronautical Charts and Maps, of the Air Coordinating Committee, met Tuesday, January 8th, to consider specifications for Approach and Landing Charts. Also on the agenda was a discussion of the Experimental World Aeronautical Chart (404), published and distributed by the U. S. Coast and Geodetic Survey.

March 1st, 1957, was mentioned as the target date for releasing the new and smaller four volume version of the pilot's approach and let-down handbook, both civil and military editions. Every effort has been made to present only that information necessary for a pilot to accomplish a safe let-down. Difficulty in finding the proper chart because of the change in manner of listing during the present transition period was brought to light. It was explained that this irritation would be corrected upon publication by using a cross-index, much like the present system used in Radio Facility Charts.

The Experimental World Aeronautical Chart (404), contains many practical changes which reduces the aeronautical overprint and simplifies the finding of desired information.

Some of the major changes are: The airways shown as a narrow ribbon of color. Tower information shown at the bottom of the chart. Code removed from the face of the chart. Reporting points removed. Colors depicting terrain relief changed. Copies of the chart can be obtained from: The Director, U. S. Coast and Geo. Sur., Department of Commerce, Washington 25, D. C. Comments and suggestions for further improvement are welcomed. This is your opportunity to express any ideas along the line of map simplification you may have been harboring these many years to the proper agency.

Some comments have already been received and would seem to indicate a general desire to retain the reporting fixes, and the station identification code on the face of the chart. The colors used have come under some criticism and will be changed to afford better relief definition as soon as some technical difficulties have been resolved.

By way of an informational safety note, formerly all World Aeronautical Charts were revised every six months; because of monetary considerations this still remains true for but two-thirds of the charts. The remaining third is revised but once a year. Because of the rapid changes taking place affecting airspace and airways, it is suggested that you check the list Dates of Latest Prints on display with authorized agents.

Threshold Contact Height Estimates At Newark

A program begun a year ago in an attempt to solve the slant visibility problem is continuing at Newark Airport. All pilots making a straight-in ILS approach to runway 4 are given an altitude, called the Threshold Contact Height which is a vertical distance, but is based on the slant visibility. It is prepared by a special project conducted by the U.S. Weather Bureau when the ceiling is less 1000 feet, or the visibility is less than 2 miles. The value is given to the tower and is transmitted from there to the pilot via 118.3 mcs tower primary VHF. The Threshold Contact Height is the altitude at which the pilot can expect to have contact with the green threshold lights. It is a new measurement not ordinarily included in weather observations. In order to determine the accuracy of the information being given, all pilots are requested to report *"GREEN LIGHTS"* via 118.3 mcs. at the moment they first see the green threshold lights of runway 4. At this time a photograph is made of the GCA radar scopes. A comparison is later made between the estimated value and that obtained from the radar picture. Authorities advise that there are no legal minimum requirements regarding slant visibility. Hence a pilot *cannot* be charged with a violation on the basis of his report of seeing the green lights.

Nationwide Air-Ground TELCO Net Tests

Now under way are investigations into the ultra-high frequency channels for aircraft-ground telephone service which will enable business aircraft to call any point in the United States using the existing telephone ground lines hooked into "pick-up towers" along the nation's airways. First tests are scheduled for early 1957.

Of equal interest is the soon-expected FCC approval of 123.0 mc. as a "special-service frequency." 122.8 as well as 123.0 mc. will be open to messages which are defined as pertaining to the "portal to portal" transit of the aircraft. 122.8 is to be used on airports with no control towers. 123.0 is to be used on airports with control towers.

Special service messages are those relating to the efficient and economical use of aircraft and to the efficient portal-to-portal transit of passengers, such as the ordering of surface transportation, food and lodging, the notifying of friends of expected arrival time or change in aircraft destination, and similar non-safety type information.

safety exchange

Take Off Weight Does Vary With Airport Elevation!

At the recent convention of the NBAA in Miami, opinions were expressed to the effect that the Civil Air Regulations do not require executive aircraft to observe a variation of take-off gross weight with altitude. We are indebted to Flight Safety, Inc. for the following facts:

1. Airplanes certificated for higher gross weights under Special Regulation 407, such as the DC-3 above 25,200 lbs. and the Lodestar above 18,500 lbs. are required to have CAA Approved Airplane Flight Manuals showing compliance with T-Category performance requirements. These airplanes must observe the reduction in take-off weight with airport elevation shown in the manual. Since SR-407 states this rather obscurely, a meeting was held by the Bureau of Safety Regulation, CAB, on March 20, 1956, to affirm this. At this meeting, the minutes of which were mailed out by the hundreds to executive pilots, it was categorically stated that non-observance of the take-off weight variation with altitude places the pilot in violation of the C.A.R. regardless of whether amendments are made to C.A.R. 43.

2. Airplanes such as the Mark I and Mark II Learstar, the Grumman Mallard, the Convair 240, 340 and 440, the Martin 202 and 404, which are currently certificated in accordance with T-Category performance requirements and others to be so certificated in the future, must observe the variation of weight with altitude shown in the manual.

3. Airplanes such as the D18S, E18S, Cessna 310, Piper Apache, Aero Commander, A-26, Ventura, Super Ventura, etc. which are not in any way legally tied in with T-Category requirements are exempt from weight-altitude variation.

4. Only aircraft operated in accordance with CAR 40, 41, and 42 are required to observe *runway length* requirements shown in the manual. Consequently, since executive operations are conducted under CAR 43, all such operations are exempt from observance of *runway length* requirements.

Type Ratings For Pilots of "Twins" Under 12,500 Lbs. Proposed

NBAA notes that present multi-engine class rating is under close examination. Accident rate increase, many believe, is due to inexperience with varying flight performance of different types of light twins. Current rating permits pilots to fly any twin or 4-engine aircraft subject only to requirement of recent time—such as 6 take-offs and landings, in prior six months, etc.

"Natural" Flotation Gear For Unplanned Ditchings

Nobody plans forced landings, at least not prior to the occurrence of the condition producing such unhappy events. Still, without being pessimistic, a little forethought about your surroundings inside and out of a plane before takeoff, enroute and on approach could pay dividends.

It is probably natural prudence and automatic for any experienced pilot to consider the immediate surrounding terrain prior to takeoff or on final in event of an unexpected sudden go-around. V-1 and V-2 are nice figures to conjecture with but statistics talk louder and many's the twin that hasn't "made it" on a one-engine out after takeoff.

By almost literally boot-strapping, some pilots have managed to stagger into small or larger open areas in reasonable range and almost invariably, if an open water area so common to many fields is nearby, to ditch as a choice to draping the airplane over sundry buildings or other immovable obstructions.

This natural and very intelligent choice leads up to the subject of survivability once the aircraft has come to rest on or somewhat under the water. Most landplane operations, especially domestic, never contemplate seriously the possibility of ditching, so whether flight operations are conducted adjacent to large lakes or ocean shorelines, ditching gear common to seaplane or flying boat operation is conspicuous by its absence.

In an article in the ALPA Airline Pilot, Capt. R. F. Adickes, points out that the average crew and passengers of a normally land-operated airplane are literally surrounded by natural flotation and survival gear that have too often in the past been ignored and allowed to sink with the airplane while survivors of a ditching crash, one by one expired from exhaustion and inability to stay afloat long enough for a reasonable rescue attempt.

"ALPA representatives have pointed out *repeatedly* that a head pillow or seat cushions, standard equipment—would make suitable emergency type life preservers *with slight* inexpensive modifications."

There is neither significant expense nor effort involved to excuse not *now* ascertaining whether the above or any other similar part of airplane equipment is both useable and easily available as emergency life preserving flotation gear. Even in the small personally-flown business type airplane as well as the larger airline-type executive transport, seat cushions and backs could be made waterproof. Then they should be fastened in place only with snaps, "dot" fasteners or the like, so that even a child could pull one clear with deliberate effort. Passengers should be apprised of this fact before takeoff over water anticipating possible incapacitation or unconsciousness of the crew after a ditching crash.

For that matter, why are extra pillows usually stored in a comparatively inaccessible place for comfort use later in flight? Easily removable back seat cushions could do more good for a passenger in front of his head and chest, than behind his back in event of a crash. They are already at hand if the event is occurring on water.

The small head pillows under each arm of a normal sized person will support a surprising amount of weight. In this regard, obviously plastic-covered or all-foam rubber pillows and seat cushions are preferred original equipment to anything else available.

To sum up, a forced water landing is not infrequently a better choice than an alluring but much too undersize and maybe obstruction-strewn open land area. If it is, even your landplane is equipped, with only a little ingenuity, with quite adequate emergency flotation gear.

RTCA Develops Criteria For Automatic Path Flight Approach To Landing

The Radio Technical Commission for Aeronautics has released a report on its studies of the application of automatic flight techniques in the take-off, cruise, approach, landing and taxiing phases of aeronautical operations.

The report, prepared by RTCA Special Committee 18, describes six categories of automatic flight and defines fundamental terms to establish a basis for the formulation of automatic flight equipment nomenclature. A detailed analysis is made of the final approach problem. Criteria for the adjustment of ILS localizer facilities are recommended together with procedures whereby compliance with these criteria may be ascertained. Standards for localizer receiver output and autopilot coupler output characteristics are also recommended.

Copies of the report (Paper 151-56/DO-74, "Automatic Flight") may be obtained from the RTCA Secretariat at a cost of $1.50 per copy.

American Airlines test pilots Ken Herschel (*left*) and Dick Green (*right*) tell Fisher about the program of an impending flight t

One of a series on the care taken by leading airlines to keep their planes fit for flight—and why this care has led them to select CHAMPION SPARK PLUGS. First—American Airlines and a look at . . .

C.A.V.* at Tulsa

By **HERB FISHER**

**Continuous Airworthiness Visit*

HERB FISHER,
international aviation authority, veteran test pilot, and author

RECENTLY I was a much impressed visitor to the vast American Airlines Overhaul and Supply Depot at Tulsa, Oklahoma, where the world's largest airline fleet operating from a single maintenance base is kept in top flight order. Each of American's 200 planes comes to Tulsa at least six times every year—1,200 aircraft visits in 12 months—more than 1,500 engines completely rebuilt. In the shop, and outside on the flight line, nearly 4,000 skilled employees do the huge maintenance job needed to "keep 'em flying."

Tulsa has the dual functions of preventive maintenance and progressive overhaul. Both have the single objective of finding and correcting trouble before it starts, and before an airplane is "out of hours" and ineligible to carry passengers. American predicts, with amazing accuracy, the working life of almost every piece of equipment. This makes the job of the maintenance department clear, if not easy. The department sets up its schedule so that it anticipates mechanical trouble and takes preventive action before it occurs.

A good example of American's preventive maintenance is the autopilots flown on American's aircraft. Autopilot system components have a CAA authorized overhaul period of 5,000 hours. American pulls them at 2,500 hours —an admirable illustration of the lengths to which the airline will go to insure safety and reliability.

C.A.V. — Schedule for Airworthiness

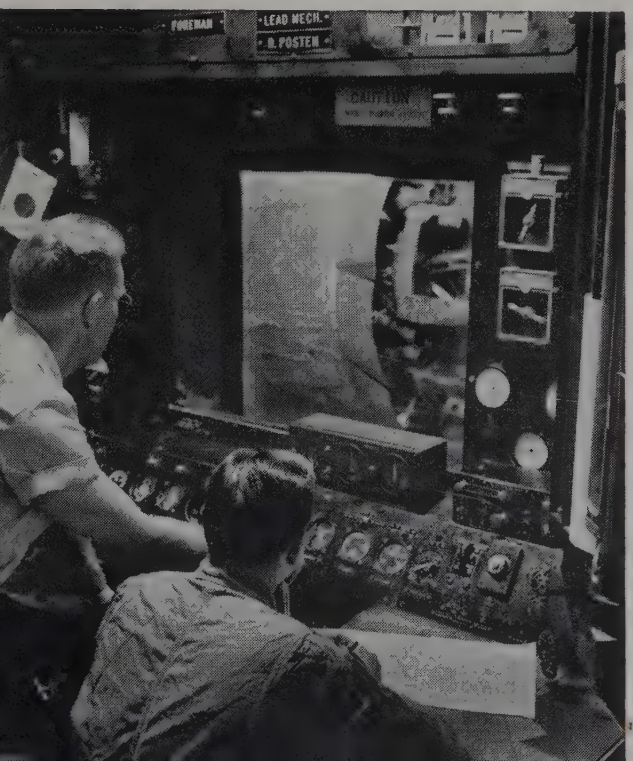
Progressive overhaul is American's other maintenance must. Operating on a regular schedule, every aircraft in American's fleet visits Tulsa for its C.A.V.—Continuous Airworthiness Visit. About ten days are required per visit, during which time AA's inspectors and mechanics will perform an average of 5,400 different jobs on each aircraft, taking thousands of man-hours. Nothing is overlooked.

When a plane arrives in Tulsa for its C.A.V., inspectors are assigned to go over the entire airplane, checking its structure, functional systems, appearance, etc., using special test equipment. In ten days the plane leaves Tulsa "newer than new," but just a little more than 2,000 hours away from its next visit.

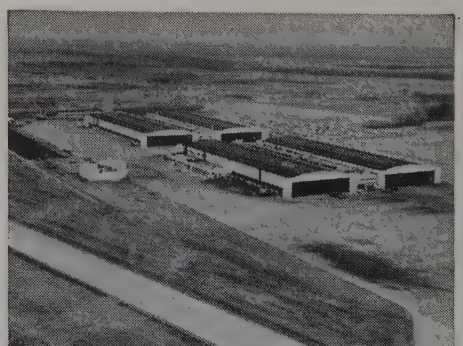
Using this technique, American has never had to take an airplane completely apart. These trips to Tulsa do the "out of hours" overhaul job progressively—and do it better.

Champions Proven on Engine Line

I was especially interested in the engine line, where every single piece of the big Pratt & Whitney and Curtiss-Wright turbo-compound power plants gets a meticulous inspection. I saw the typical overhaul for engines, running from



American Airlines technicians put rebuilt engine through its paces in test cell before running flight tests on it.



These four hangars—center of American's maintenance operation—contain 15 acres of floor space, handle 1,200 aircraft overhaul visits a year.

Transferring Champi Spark Plugs from origir carton into America engine-set box for shi ment to line static Champion's consiste high quality makes t possible without furth inspection.

C.A.V. at Tulsa...

a special report for Champion Spark Plug Company

Top American Airlines executives at Tulsa tell Fisher of Champion's highly satisfactory performance. *Left to right:* E. O. Schroeder, Assistant Vice President, Quality Control Division; Fisher; J. B. Montgomery, Vice President, whose duties include supervision of the Tulsa base; W. C. Lawrence, Assistant Vice President, Engineering Division; and D. F. O'Donoghue, Assistant Vice President, Overhaul Division.

dismount and disassembly through cleaning, parts inspection, rework where needed, reassembly and testing.

It was during parts inspection, which includes tests on spark plugs and other engine components, that American began telling me about the splendid record of reliability, service, and economy of Champion Spark Plugs.

W. C. Lawrence, Assistant Vice President—Engineering, said that the whole area of ignition—spark plugs, magnetos and leads—has been the No. 1 cause of mechanical delays during the last 21 years. It is for this reason, he told me, that American particularly likes Champion's dependability and economy.

"American's philosophy is to search constantly for the most reliable ignition components available," said Lawrence. "We want simplicity, reliability, and ease of maintenance, and Champion has proven over the years to give it."

T. J. Harris, Director of Power Plant Engineering, stated that he admires Champion's research and development program, and their desire to define and resolve ignition and spark plug problems. He feels that Champion has made a notable contribution to American's operation.

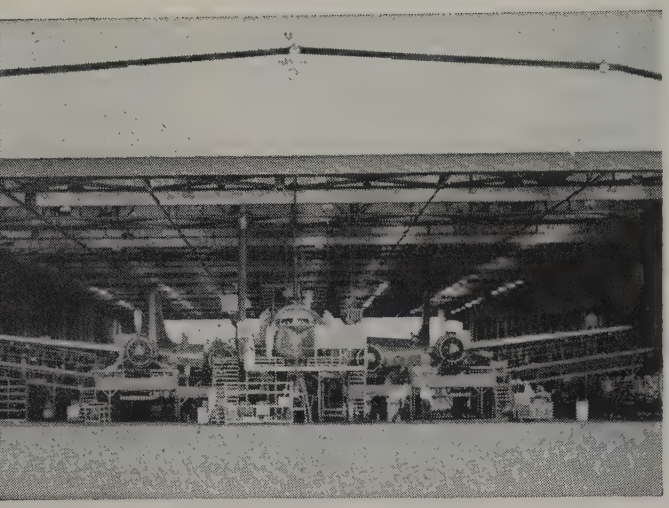
Demand Quality with Economy

E. O. Schroeder, Assistant Vice President of Quality Control Division, told me about AA's experience with Champion economy. "For years the airlines have had to concentrate on obtaining the best possible parts and accessories that would cause the least trouble. But now we are at a stage where aviation has turned into big

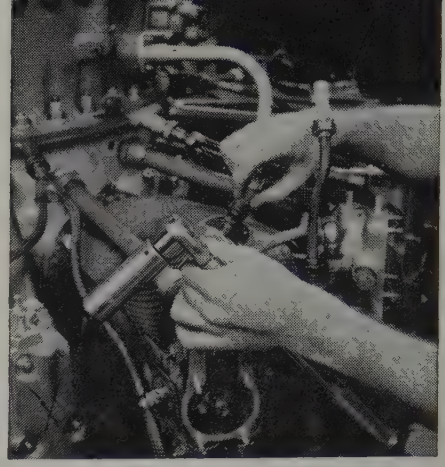
Champion Aviation Representative Russ Biegel monitors line service spark plug installation as part of service coverage. Technical information gained is available to all Champion users.

The engine line produces 1500 "new" engines a year. After four hours in test cells, running at all speeds, engines are flight tested by engineering test pilots for another four hours.

D. E. Tait (*left*), Direct of Supply, had favorab comments on Champion service, economy and ava ability. T. B. Roberts (*center*), Manager of Pu chasing; (*right*), T. J. Harr Director of Power Pla Engineering.



During a C.A.V., the interior is completely disassembled, freshened, and rebuilt where needed. All structure is completely inspected and components are replaced as required. Even X-ray is used for checking critical areas.



Removing spark plugs from engine for careful testing. Rigorous inspection over the years has kept American convinced of Champion's dependability.

business. As a result, without any slacking of quality, people in the aviation field must be concerned with price as well—and Champion has been a leader in reducing spark plug prices.

"Spark plugs are a major expenditure with us, and we consider ourselves fortunate to be able to get a quality product for the lowest price consistent with reliability and performance."

10,000 Hours on Champions

Another American man that I later talked to at New York International Airport was Captain S. P. Bittner, who started flying September 14, 1924, and has accumulated 30,000 flying hours. He has been flying for American since 1929. Since Champions have been used for 10 years, Capt. Bittner has flown approximately 10,000 hours with Champion Spark Plugs, or roughly 40,000 engine hours. Capt. Bittner stated that after flying for 10 years with Champions he has never encountered true plug trouble.

The final word on Champions came from J. B. Montgomery, American Vice President—Maintenance and Engineering. "These plugs give us the high, consistent quality we need to assure long life and trouble-free operation," Montgomery declared. "We also like Champion's realistic price structure and the fine factory and field service they give us.

"Champion has built excellent spark plugs over the years for American Airlines. If they were not a quality product, they would not be on our engines."

The Champion people feel that American's experience speaks for itself in indicating to *all* pilots the superior performance and reliability of Champions.

—Herbert O. Fisher

If you have the responsibility of selecting aircraft spark plugs, consider the fact that American Airlines . . . with millions of engine-hours experience as a guide . . . chooses CHAMPION SPARK PLUGS

Capt. S. P. Bittner, American pilot since 1929, tells Fisher he has flown 40,000 engine hours on Champions without encountering true plug trouble. Capt. Bittner flies the non-stop flight between New York and Los Angeles.

Progress Report: BEECH AIRCRAFT

Sparked by an announcement of 1956 commercial sales of $40 million, Beech Aircraft Corp.'s annual International Distributor-Dealer Sales Meeting at Wichita saw the unveiling of Beech's "25th Anniversary" line of business aircraft, comprising the Twin Bonanza, H35 Bonanza and Super 18.

As a climax to Beech's best year of commercial sales, the meeting was also highlighted by the presentation of awards and commendations, and the announcement of promotions for two key executives.

Distributors paid special honors to Mrs. O. A. Beech, company President, acknowledging her contributions to the nation and to business and industry with a scroll signed by 78 members of the worldwide distribution organization.

Announcement was also made of the appointment of Leddy Greever as Vice President of Commercial Sales and Michael G. Neuburger as Vice President of Export Sales.

More than 60 individual performance awards were made to Beech salesmen who helped boost sales to a figure $6½ million higher than 1955.

Two versions of the six-place Twin Bonanza were revealed. The Model E50 is the first supercharged business plane in the Twin Bonanza series. With two 340-hp Lycoming engines, the E50 Twin Bonanza has a top speed of 240 mph, and cruises at 228 mph on 70% power. Service ceiling of the E50 is 24,800 ft.; it can take off over a 50-ft. obstacle in less than 1300 ft., and climbs at the rate of 1620 fpm at sea level. Gross weight of the E50 is 7000 lb.; it can carry a useful load of 2560 lb. with full fuel tanks, allowing 1420 lb. for passengers and baggage.

Both the E50 and the 295-hp D50 have a non-stop range of 1650 miles. In both models Beech offers "super soundproofing" and custom interiors available with any of six different seating arrangements, highlighted by reclining chairs and a couch nearly seven feet long. Technical improvements include: new magneto and generator filter to decrease radio interference; new propeller control boot and carburetor heat system for protection against icing; a shock-mounted instrument panel to give more accurate readings and prolong instrument life. A 50,000 BTU heater supplies enough heat for a 5-room house. All placards, including switches, radio, and schematic fuel panel, edge-lite. Post lighting for instruments.

Fastest 4-place business plane, the 1957 H35 Bonanza has a top speed of 206 mph, cruises at 196 mph on 75% power. Fitted with a 240-hp Continental engine, the H35 has a range of 1170 miles with auxiliary tanks, climbs at 1250 fpm, has a service ceiling of 19,800 ft., and requires a take-off run of 670 ft. Gross weight is increased to 2900 lb. Now on the Bonanza is a "military type" propeller, with a hydraulic governor, to maintain constant prop speed, as standard equipment. Front and rear seats now have disappearing arm rests in center, front seats adjust individually fore and aft and reclining. Lighter-weight seat belts and shoulder harness incorporate quick-connect fittings. ARC, Narco and Lear radio equipment is optional. Enlarged trim tabs and redesigned control system give "heavy airplane" feel with light control pressure.

Instruments are regrouped for easier reference; the safety-type four-position control wheel permits operation from either the right or left seat.

The 8-place, 450-hp Super 18 has a 12% increase in range (to 1626 miles with a 45 min. reserve), a top speed of 234 mph and a cruising speed of 215 mph. Service ceiling at full gross weight of 9300 lb. is 23,300 ft.; with a gross weight of 8750 lb., the Super 18 will climb to 25,700 ft.

Take-off over a 50-ft. obstacle requires 1800 ft. at sea level; landing over the same barrier requires 1700 ft.

Outstanding optional equipment for the Super 18 is the Geisse Safety Gear (SKYWAYS Jan. 1957) for safer crosswind landings.

Other features of the Super 18: sliding cockpit chair for "stretch-out" room; built-in wing landing lights; redesigned engine cowling for more efficient cooling; new heat system for anti-icing protection of carburetor; 90,000 BTU heater which changes cabin air every two minutes; standard equipment tubeless tires for reduced maintenance costs; auxiliary wing tanks add 120 gal. extra fuel for a total of 318 gal.

The second and third units of the Beechcraft Travel Air are near completion. Designed to cruise at over 200 mph with a range of 900 mi., it is designed to utilize very small fields. In addition to its agility, extensive experiments have been made to make the Travel Air the "quietest twin-engine plane in the world." John P. Gaty, Beech V-P, points out that high noise levels are fatiguing to pilot and passengers, and explained that various engine arrangements had reduced internal noise level by about half in the front seats and ¾ in the back seats over that measured early in the program.

First production units of the Beech Travel Air, according to Gaty, "should be off the line in late spring."

Beech also reports that "fine progress" is being made in meeting all requirements for CAA airworthiness certificate with the 4-place twin-jet MS 760 business plane. Beech staff engineers have been in Paris to assist in qualifying the MS 760 for certification.

* * * *

Many techniques have been employed in solving one of aviation's major problems: aircraft maintenance. One of the most successful of this mass of techniques has been the Service Clinic Program sponsored and administered by Beech Aircraft Corp. In recognition of the mark this program has made on the field, the Board of Editors of the Greer Awards was unanimous in choosing this company as winner of the Greer Maintenance Award

PRESENTATION *of the Greer Maintenance Award for 1956 is made to Paul E. Allen (left), Quality Control Mgr. for Beech Aircraft Corp., by Edward M. Greer, Pres. of Greer Hydraulics, Inc., for the outstanding contributions to the aircraft maintenance field for 1956. The award comprised an enscribed plaque and a $500 honorarium. G. Lawton Johnson, Executive Vice President of Operations of Greer, witnesses the presentation.*

for 1956. On Jan. 22, 1957, the Award was presented to Paul Allen, Quality Control Mgr. for Beech and Administrator of the Service Clinic Program, by Edward M. Greer, President of Greer Hydraulics, Inc.

The award is presented to an individual or company for the best idea, proposal or design leading to the solution of an aircraft maintenance problem for that particular year.

In his acceptance speech, Allen said, "Sound maintenance programming is one of the most important factors in the future growth and continuing success of business or executive aviation... Recent studies reveal that the various Beechcraft models are providing their business users a greater annual hourly usage than competitive makes of aircraft. . . We feel that the Beechcraft Annual Courtesy Clinic program has been an important factor in providing this apparent superior product reliability."

In a letter acknowledging the unanimous selection of Beech Aircraft for the 1956 Greer Maintenance Award, Mrs. O. A. Beech, company President, said: "This is a fine recognition of the diligent efforts of Beechcraft's service policy. . . Every Beechcrafter joins me in thanking you for this recognition."

Beech's entry dealt with its Service Clinic Program, which consists of free periodic inspections by qualified Beech technicians of all Beech aircraft. Operating procedure for the program is as follows: all Beechcraft owners in a particular area are notified in advance that the Beech serviceman assigned to that area will be at a particular airport in that region on a designated day, and will inspect all Beech aircraft at that time. In addition to the inspection, he will make all the necessary adjustments or improvements on the planes that he deems necessary. The Beech serviceman performs the same procedure at other stops on his assigned route.

Since the Service Clinic was begun in 1949, over 7000 inspections have been made. In 1956, some 1350 Beech planes were inspected by Beech technicians who visited 33 distributor locations in 27 states. Beech Aircraft is the only company offering this free service to its business aircraft customers.

Archie N. Colby, General Sales Mgr. of Greer, announced that the Greer Awards would continue in 1957, and that the company is now accepting entries for the 1957 Maintenance Award. A brochure describing the Greer Award is available from the sponsor at New York International.

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Airport Use Panel Recommendations On Civil/Military Use of Lambert

As a result of a public hearing conducted at St. Louis, Mo., to determine the most feasible and compatible civil/military use of Lambert-St. Louis and other airports in the STL metropolitan area, the Airport Use Panel of ACC has released these *recommendations:*

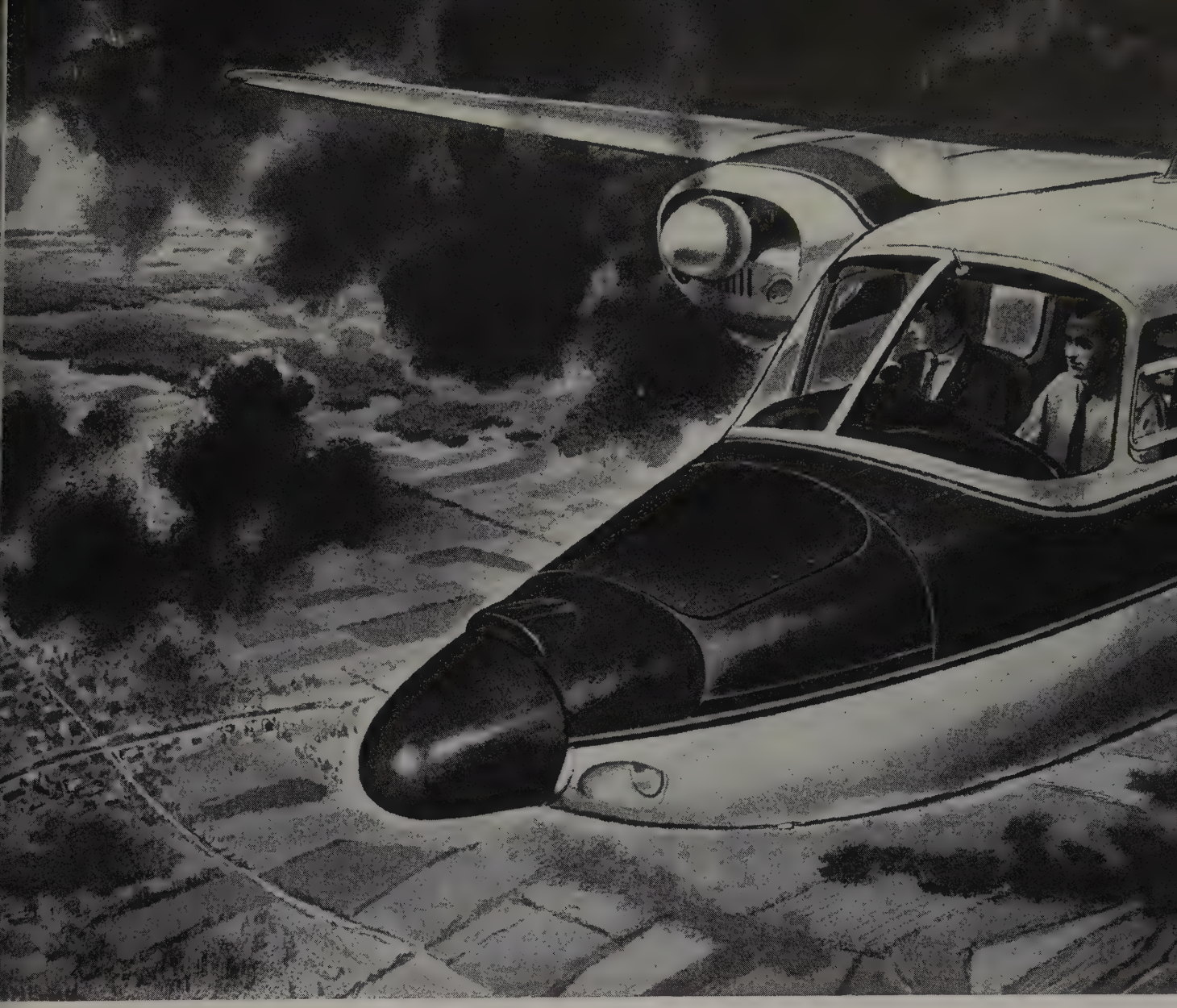
"1. The Dept. of Defense promptly initiate such action as may be necessary to select a site and develop a new airport in the Mo. environs of St. Louis for the Naval Air Reserve and Air National Guard units now located at Lambert Field.

"2. The flight testing activities of McDonnell Aircraft Corp. be transferred from Lambert Field as soon as practical and that consideration be given to the use of the new airport for this purpose.

"3. After the site has been selected for the new airport, appropriate Govt. and local officials also determine the practicability of this airport being jointly used by civil aviation. If such joint use is determined to be feasible and mutually acceptable, it is further recommended that the Master Plan be prepared accordingly, that equitable financial arrangements be made, and that proper operational and maintenance agreements be negotiated, to provide the facilities required for such use.

"4. If joint civil/military use of the new airport is determined infeasible, plans be initiated to develop additional 'all-weather' civil airport facilities suitably located in the St. Louis area.

"5. In the planning and development of any additional airports in the St. Louis area, air traffic control procedures, together with any related airspace problem, be properly coordinated with the appropriate local and Federal agencies prior to the final approval of the sites involved."



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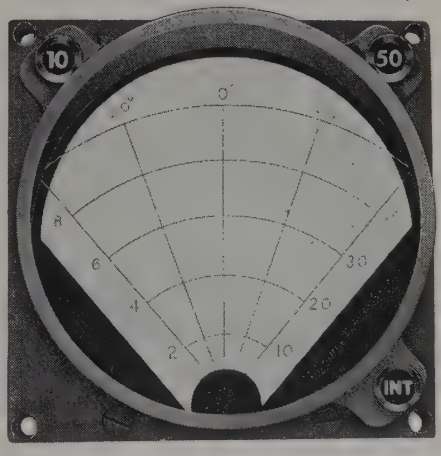

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Skyways Round Table

(*Continued from page* 18)

'short one' and getting into a cockpit and flying that aircraft. But flying has become more commonplace than it was earlier, and perhaps not enough emphasis has been placed and maintained on physical status."

Hunsaker: "It was my impression, based largely on what I suppose is a sympathetic feeling, that the average level of physical fitness has deteriorated in recent years. But I should like to know if there is any medical statistic that would either disprove or confirm my suspicion that there has been a general, perhaps very slight physical degeneration in people within the last 50 years, while at the same time there has been this dramatic advancement in the aircraft itself, and, therefore, in the requirements which the aircraft puts upon the individual. One line on the graph goes up, and the other goes down; there should be parallel development."

Dr. Raymond: "I don't think things are quite that bad, but I do think that the average pilot, as Dr. Kraissl said, is not aware of what these things will do to him when he flies, and he will let himself drink one or two more than he should. He doesn't allow time enough for it to dissipate, and it slows up his reflexes when he needs them most.

"But the answer to your question is very briefly stated. When you take life-insurance statistics, you see that the age of the average individual has increased from 45, which it used to be about 15 or 20 years ago, to about 68. This shows that there are more people living longer, and, naturally, when people live longer, their reflexes slow up. You must say that the medical profession has actually advanced, in the sense that we can keep people living longer."

Hunsaker: "Is there any correlation between the fact that they are living longer and the fact that your average pilots are between 20 and 45?"

Dr. Gentry: "*Let's keep the record straight: this increase in the length of life is due largely to a lowering of the death rate among children; you can be deceived if you don't clear that up. I agree with what Dr. Kraissl and Dr. Raymond have said, but I take exception on several points. I don't believe that an airline pilot drinks before he takes off carrying passengers. At least, he doesn't do it many times, because if he's apprehended, he's in trouble. He violates all the rules. It's a known fact that if a man has more than two cocktails within twelve hours of flight, that the alcohol remaining in his body, combined with even a moderate amount of smoking, and a lack of oxygen, can seriously affect his vision. I refer you to a textbook that Dr. McFarland has published, called* Human Factors in Air Transportation. *It's based on findings from both military and civil aviation. It's full of statistics like that.*

"We know from tests in low-pressure oxygen chambers that the amount of oxygen available to a man can definitely affect his vision. We flew carrots all over the world during World War II to help night fighters, because we knew that the Vitamin A in them helps night vision. Lack of oxygen, excessive smoking, and drinking, within 18 hours of flight time these things all add up, and the pilot will notice it himself."

"There is still another factor: our modern young men are living in a different age, and they have been forced to learn to judge distance, and to do things that people in the days of the Wright brothers didn't have to do. You can prove it by going to backward countries, where they don't have fast transportation, and you don't find the coordination and the ability to judge distance that you do among people who grew up riding bicycles, motorcycles and faster-traveling automobiles. We live in a faster age, and man has been able to adapt himself to it to a very large degree. The fact that a man can fly a jet plane at supersonic speeds, and even bail out from one while traveling faster than the speed of sound, proves that he's a pretty good man. Jet pilots will tell you that when they go through the sonic barrier they get a lot of yawing and pushing around from the jet plane in front of them, and a man's got to be very alert, and his reaction time very good, or he's in serious trouble. We'll get into that in commercial aviation within a few years, unquestionably. I for one would not say that our young pilots today are not as good physically and mentally as those we had during World War II."

Al Winter *(Civil and Military Flight Instructor):* "I am a little bit dubious about the effect of physical defects in flying modern aircraft. From the observations I've made, physical condition seems to have very little to do with pilot proficiency. If it did, we could probably take the pilots from Mr. Hunsaker's airline and see who could run around the block fastest, and that doesn't seem to be the way you select your pilot material. None of us is in the same good physical condition he was in ten years ago, but that doesn't mean we are less competent safely and successfully to pilot an aircraft. Probably you'll find that the senior pilots on your airline are the ones who have the 'least good' physical condition.

"I think there's something else involved, and it's emotional. Judgment seems to have a lot to do with it. I have taken cripples, and had much more success with them than with people who are in top-notch physical condition.

"We have already, with piston-driven aircraft, outstripped the physical ability of the pilot to keep up with them on rates of closure, for instance, and collision courses. There's something else involved besides reaction time, and that's *evaluation time,* which is much larger than reaction time in every case."

Hunsaker: "I think we're talking about two things. One is *learned skills,* and the other is *physical abilities.* Visual acuity is a physical ability; judgment is a learned process."

Dr. Raymond: "Before you go any further, Mr. Hunsaker, you must remember that visual acuity is only a step in acquiring judgment, particularly since everything is more or less stimulated from vision. The vision has to go to the reflex centers of the brain, and if the brain isn't functioning at its best, the judgment will be faulty. Everyone here has had the experience, in driving an automobile, of seeing something, and not doing anything about it until they're right on top of it. The same thing happens when a pilot is fatigued. He sees something, he knows it's there and that he has to evaluate it, but he can't evaluate it properly because the reflex centers are slowed up, perhaps because of depletion of oxygen concentration at that altitude, and sometimes an extra drink can make the difference between whether he can make the right judgment or not."

Dr. Gentry: "*Mr. Placek, perhaps you can tell us about physical handicap, and its effect on pilot proficiency.*"

William F. Placek *(Aviation Safety Agent, CAA):* "We do give medical flight tests. The results usually vary; they don't seem to have too much difficulty with the average handicap, although sometimes we do with an extreme handicap, either in vision, or to the arms or legs, as through polio or accident. However, the greatest number of flight tests we seem to give have to do with not meeting the standards for visual acuity. We find that in most cases the applicants background or experience compensates for his handicap, and demonstrates that he has a safety factor and is capable of holding an airman's certificate. On the other hand, we have experienced some cases where the applicant has some restriction in motion in the arm or leg, where we have to conduct the flight test in a specially rigged aircraft, in which case, if he does demonstrate an adequate safety factor, he is restricted to that particular airplane. Lately we seem to be getting a lot of applicants who are deficient in color vision, and also applicants who fail to meet the requirements for visual acuity either for third or second class

DR. RAYMOND *(r) raised the possibility that aviation technology is advancing faster than human beings can adapt to its requirements. Owen Hunsaker (l) suggested that such technological advances as proximity warnings might relieve the pilot of many exceptional physical demands.*

medical certificate. But on the whole I believe, like many of the comments made here, that proficiency, attitude and previous instruction play an important part in the applicant's overall ability. Background, the way the applicant has been brought up in learning how to fly, also contribute to his passing the medical flight test."

Winter: "Would you say that proper instruction is more important than physical condition?"

Placek: "Yes, I would agree with that."

Dr. Kraissl: "Dr. Gentry, I would like to renew the question of fatigue, and the problem of the ageing pilot, which was touched upon very briefly, and which is essential in aviation. In the military service, we have the designation of Command Pilot, where the individual's judgment is reliable. But with the older pilot, it is well known that fatigue can enter the picture much more quickly than it does with a younger pilot. I feel that in industry the older pilot should not be retired, but should be kept in a status similar to that of Command Pilot, to fly on the aircraft and to use their invaluable judgment, but to have a younger man at the control on longer trips to handle the exact requirements of ILS or GCA approaches.

Dr. Gentry: *"On the problem of disabilities, and whether a person can fly safely with a disability, a good record compensates for inability to meet the stated requirements in practically any part of the examination, anything that might not suddenly incapacitate the pilot and consequently cause an accident. Many people who have become disabled—even amputees—can learn to fly safely. We've had some wonderful pilots with only one eye: Wiley Post is the classic example.*

"We know, from the pioneers in aviation, that there are a good many factors involved in the judgment of distance, speed and similar things, other than ordinary visual acuity. There are many people today, who fly big airplanes across the ocean, who don't have perfect vision in both eyes, but who are very valuable. The older pilots are still very valuable, although they are reaching the age when reaction time is slowed up, and they can't pass the physical examination for life insurance and things like that. In long flights, particularly over oceans. I think the commercial lines have found that these older pilots have especially good judgment when the weather goes bad, or when there is a question of alternate landing fields. They don't get excited, and they don't lose their judgment.

"The same thing occurs in medicine. Good judgment comes from experience.

"There are certain limitations to this business of physical disability. They are all spelled out in detail in the Civil Air Regulations, based upon many years of experience. In my work as Regional Flight Surgeon for the CAA, I have nearly 500 doctors examining pilots every day, and sending their reports in, and I see it time and again. We're very generous with waivers on people when it's justified, but some applicants, for instance, one who has had a nervous breakdown, an organic nervous condition for which he had to be hospitalized, is not good material. Statistics prove that he may suddenly crack again and have to be hospitalized; he is not a safe pilot. By the same token, someone with organic heart disease, who might be suddenly incapacitated, ought not to fly an airplane. In many airplane accidents, you know, the cause cannot be determined accurately. Many times the cause of an accident is listed as 'pilot error'. In order to correct that condition, I think eventually we must have a law that requires an autopsy on crew members who die in an airplane crash. You'll find that a lot of such accidents were caused by the pilot having suffered a heart attack.

"It's easy to see that a man having a heart attack while driving an automobile or flying an airplane might wreck either one of them. If a person is found dead in a car that has run off the road, under existing law the coroner can call for an inquest. If it's a question of whether the accident killed the driver, or if he died and the accident resulted from a heart attack, you can have an autopsy to prove it, or to rule it out.

"Certain other organic diseases may result in serious consequences, for example diabetes, where a person must take insulin every day. When such a man flies an airplane, and the weather goes bad, the radio is giving him trouble, he's going to run out of gas and he

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doesn't know where to land, you know immediately that he's going to burn up that insulin, and his diabetes becomes suddenly disabling.

"We can't compromise with some of these organic diseases, because the life of the individual and those of the public are at stake. However, people who have had polio, or have lost an arm or a leg in an accident, may be able to learn to fly a plane with special controls, and be safer pilots because they have already learned to live with their disability, and provision is made for that in the Civil Air Regulations.

"I am not so naive as to believe that anyone sitting here would want to fly with someone without enough coordination to throw or catch a baseball accurately, because in any type of physical activity, the desirable person is the one with coordination, experience and judgment. You want to get people who have the native ability to learn. Their behavior and deterioration due to modern living all come into the picture, of course, but some people are natural *pilots. The same thing may be seen in many fields of endeavor—surgery, law, or business. An individual who is alert, who has sufficient native ability, and receives the proper instruction: he is the one who makes a good pilot."*

William M. Lightbowne *(Bell Telephone Laboratories):* "My experience has been with the Morristown Flying Club. Most of my activities have been as a private pilot, but I have done a great deal of check-out work with our own members, who only fly an average of 30 hours a year each, and their average age is well up in the 40's.

"Now, we have problem pilots in our group, and I've flown with other problem pilots. When I call a man a problem pilot, I mean that he has some emotional complex within his mind which is a setup for a particular combination of circumstances. Be it traffic, or weather judgment, there is some combination of circumstances that is going to lick him some day, if he flies long enough. If he doesn't fly very much, and he has the commendable habit of flying only on pleasant days, he may never reach that combination of circumstances, but the more he flies, and the more confidence he gains, the more likely we are to find him sailing into that particular set of circumstances that he can't handle. The very experience he gains in flying different kinds of weather conditions and so forth will help him to deal with the situation. But some pilots have a mental bloc: they're afraid to use the radio, or some other equipment on the plane. I guess you all know circumstances where they just got rattled, and they felt a tremendous desire to get down, and they have gone down through three or 4000 feet of clouds and come out in a range of hills, or with a 25-foot ceiling. That's the situation that this particular emotional bloc, and the particular circumstances, got them into. It seems to me that the physical requirements could be a lot more lenient than they are, but that there should be some psychiatry in the medical examination for flight."

Dr. Gentry: *"There is, basically, a lot of psychiatry used in every examination. People who have had training in aviation medicine know that psychiatry is a very important part of it, along with examination of the heart, the eyes, ears, nose and throat."*

Dr. Raymond: "Maybe Mr. Lightbowne doesn't realize that some of these things we talk about in our offices aren't just social chats, but may actually be psychological exploration."

Dr. Gentry: *"I hear people saying that the CAA physical isn't worth anything. It is not designed to compete with the medical examination that you get from the medical department of a good airline. If you got the same thing from a CAA medical examiner, it would cost from $50 to $75. The CAA examination is rather a screening examination. For instance, a CAA examiner who is alert can feel your pulse and, like the old family doctor 50 years ago, he can tell a lot about your health. There's one condition, a very serious one, and liable to cause sudden incapacity, namely, aortic insufficiency, where the pulse is an important diagnostic sign.*

"When the doctor takes your blood pressure, and it records, we'll say, 140 over 40 instead of 140 over 80 or 90, he knows that the aortic valve is not working. That valve must work efficiently, like any other piece of machinery so that it can send blood all over the body after it's been to the lungs and picked up fresh oxygen. When it doesn't, you get that kind of blood pressure reading, and you get a pulse that's entirely different from that of a healthy individual. So when a doctor feels your pulse and takes your blood pressure, it tells him a great deal that you may not know. When he's giving you an examination, if he follows the CAA instructions and you disrobe almost completely, he can see a lot of things that you may not be aware of. In a physical examination, and also in a psychological examination, things that may not appear to be important may be very important to the discerning medical examiner."

Lightbowne: "There has been a development in industry, within the past 20 or 25 years, of the aptitude test, which includes a number of adjustment tests and manual dexterity tests, and various practical measurements which are applied to an applicant to determine by correlation his fitness for certain types of activity. By correlation I mean that the science in this aptitude testing consists principally of testing people of known ability, and then correlating the results of their tests with your applicant, in such a way that you can come to a reasonable conclusion that the applicant will correspond in various aptitudes to those of known ability. The only way this fund of statistical experience can be compiled is by testing thousands of people, but it does work, and I would like to see something like that included in the CAA examination."

Dr. Gentry: *"That was done extensively during World War II by the Army and the Navy, and since then by the Air Force, to determine the placement of men in bomber units instead of fighter units, for duty as navigators or bombardiers, and things like that. Sometimes, of course, the human factor comes in: there have been people who didn't get to fly bombers or fighters who thought they had been mistreated; that's just the law of averages.*

"There are some well recognized psychological tests that were worked out on the basis of thousands and thousands of examinations. That's where I think the CAA ought to spend more time and money: in improving the quality of the CAA physical examination. *It would mean teaching the local examiner to do a better job. For instance, I was amazed, when I started to work at this CAA job, to find that out of approximately 500 examiners, I had 40% who had been flight surgeons in the Army, Navy or Air Force. That meant that they had had a course in a specialized branch of medicine, six or eight weeks of intensive study in psychiatry, eye, ear, nose and throat, cardiology, physiology, etc., and then they had many months or years of active duty with an aviation unit in the military service. Another 24% of my examiners were pilots themselves; some of them fly small planes and have built up several hundred hours. A few were military pilots in World War II, and had built up three or four thousand hours of flying time. They studied medicine after the war. These men know what happens when weather goes bad, and so on; they make good examiners. They know what to look for in their examination of a pilot for all types of flying.*

"The 36% who didn't have an opportunity to get any special training, and who don't fly, do not appreciate the value of the various parts of a flying physical examination. I wish we had the time and the personnel to give such doctors better training in aviation medicine. Only within the past two or three years has there been any place to get post-graduate training, except in the military services."

Dr. Raymond: "I think Mr. Lightbowne is simply trying to say that perhaps we should be a little more stringent in our examinations, and include more of the points that you mentioned earlier. There is a need for funds for Civil Aviation Medical Research which is going on toward making physical examinations perhaps more careful in some spots and a little less rigorous in others."

Dr. Gentry: *"I will buy the more careful part only. One cannot be too thorough in a physical examination for flying today as we enter the jet age."*

Dr. Raymond: "Possibly that will solve some of our problems. In general the Civil Aviation Medical Association and the CAA are trying to make it possible for anyone interested in flying, and who feels that he is qualified, to go through completion and be a safe pilot."

Dr. Gentry: *"Do you have something to add, Mr. Brown?"*

Brown: "I would be interested in anything the Government could add to the physical examination for pilots that would help determine who is unfit.

"I would also like to comment on what Dr. Kraissl said a few minutes ago about the older pilot being a Command Pilot, and not being allowed, as I understand it, to fly the plane during the latter part of the trip. I think perhaps this should actually be reversed. The younger man should expend his energy through the duration of the flight, when it is not critical, and allow the man with the greater experience to handle the aircraft in the command capacity when the greatest amount of judgment is necessary. Until that time, the Command Pilot might reserve his energy.

"It also seems to me that the older pilot does not waste as much energy as a younger pilot does, probably because of his background experience, and they watch their health more carefully."

Dr. Raymond: "It may sound like a joke, but the insurance companies have a statement on that issue. They say that the longer a man lives, the better chance he has of living longer. I think the same thing is true of a pilot."

Brown: "Another consideration I think is important is the fact that modern airplanes, especially the jets that we were talking about at the beginning of this discussion, make trips shorter in duration. At the same time, these trips will be more comfortable for the pilots as well as the passengers, which means that it is not as necessary to have the All-American Boy, in his prime, as captain on modern aircraft.

"With high speed, and proposed proximity indicators that reach out only two miles, there is not much time to take action against a head-on collision. So, regardless of the pilot's health, I think we are going to find it necessary to have industry design and build proximity indicators that will be of value in avoiding head-on collisions. If this can be accomplished, other requirements of the proximity equipment would be secondary."

Arnold Rosenberg *(President, Arnold Rosenberg Co.):* "The suggestion that was made a little while ago, about improving the CAA physical exam, I think is a good one, but I believe we are out of balance on our pilot safety checks. The medical is stressed more than anything else. A private pilot appears for a medical every two years, a commercial pilot every year, but no one checks either the private pilot or the commercial pilot for flying proficiency once he obtains his license; nor does anyone check on his knowledge of current Civil Air Regulations. Yet lack of competency or knowledge on either of these points can be just as deadly as a weak heart. Maybe we should balance these things up on the safety checks before improving the medical, and require a pilot proficiency test at some interval, and also an examination in Civil Air Regulations. In many cases a private pilot, after receiving his license, will not practice air maneuvers to keep sharp, and after 300 hours of flying time he may not be as safe a pilot as he was the day he got his license.

"Once we balance the safety checks, then I think it would be a good idea to come out with a specification for a medical examination that is designed for the aviator. The present one may be so designed; I'm not a doctor, so I don't know, but I wonder how much the present examination tells the doctor about a pilot's reaction time?"

Dr. Raymond: "I think I can probably explain that by example."

Rosenberg: "Well, if I may, Dr. Raymond, I would like to add a few more items before you answer. How good is the present examination on fatigue, vertigo and night vision?"

Dr. Raymond: "Mr. Rosenberg, I think an incident that occurred in my office about a week ago will answer your question about panic level.

"I am the consultant for one of the airlines. They have a rule that anyone in flight personnel must get a medical clearance from one of their consultants or their own medical examiner before returning to work.

"When one man came to my office and asked to be checked back to work, the results of one or two key tests, after careful examination, didn't add up quite right. I told him that there was nothing that I could see that would reject him for work at that particular time, but I was sure that he would be laid off from work within a day or two if he went back to it in his present condition. He was safe, but he wasn't quite right. He told me he felt all right, and that I was making

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something out of nothing, but sure enough, in about three days he came back to my office.

"That's what I wanted to point out. You can't explain a headache unless you've had one, and the doctor who has experience on pilots, or medical examiners who fly themselves, know better what is safe than the man who doesn't fly. If he knows his medicine, and is interested in it, he can tell just about the time you're ready to give out.

"Medical examiners are out to see that these pilots keep flying, and we try to advise them preventively, to keep them out of trouble, because we know it's their living. We don't want to do anything that's going to keep them grounded, and we warn them ahead of time if we see things starting to add up the wrong way. Pilots are valuable to our economy.

"That's where corporations and businessmen could profit by having an aviation medical consultant who is acquainted with the situation.

"Now, as for fatigue, I think the military, at Wright Patterson Air Force Base has come to the conclusion that the outstanding fatigue factor is the seat of the pants. When you see an audience begin to squirm, it's because they are beginning to get fatigued. They have developed a seat just to counteract this, because they have found it to be one of the biggest factors in fatigue."

Winter: "I'd like to say something to Mr. Rosenberg on his concern about the panic level. Everybody has one, at some point, but I think that's an instructional problem. If you are doing something that you're trained to do, and performing in a familiar situation, you will raise the panic level. If I had to perform an emergency operation on you now, I'm sure we would both panic; but it would be completely routine if either Dr. Raymond or Dr. Gentry were to perform the operation."

Rosenberg: "I think emotional stability would have something to do with it, but of course I haven't the medical knowledge to comment on anything like that."

Dr. Gentry: "*The same thing occurs when you go in to take an examination for life insurance. The doctor who examines you is aware of the fact that if he approves you, and you are the unstable type, that you are going to cost the insurance company money if you are driving and freeze at the controls when some of these cowboys who tear along through traffic start coming at you. The same is true of pilots. The examination becomes more complicated, and the rates go up, when there is evidence of an unstable nervous system, or other things that affect safety, such as kidney disease or high blood pressure.*"

Dr. Kraissl: "I think that the happy relationship which normally exists between instructors at airports and CAA examiners and the doctors examining can be of utmost value in determining whether or not an individual is truly psychopathic or simply a little bit emotionally disturbed when he first starts to fly. We've always had a happy relationship at Teterboro, and problems have often been settled that way.

"With regard to Mr. Lightbowne's suggestion that some type of psychological aptitude test be given, it seems to me that it could be worked in with the CAA examination, rather than having it a true medical examination."

Winter: "Are there any proposals to reduce the frequency of the physical examination or the physical requirements to qualify for the various grades of medical certificates?"

Dr. Gentry: "*Well, as you probably know, Congress appropriated $100,000, two years ago, to be spent in the study of physical requirements, and the Flight Safety Foundation is now at work on that. They are going to conduct a very thorough study of existing CAA and CAB regulations, and what changes might be made. Their report is due October 1st, 1957. It will then be a question of working out the details as to whether the period between the examinations and the requirements for the different classes of pilots will be changed. In America it's a real problem as compared to other parts of the world. We have many more planes and pilots than any other country.*"

Winter: "It seems to me that we have fewer potential pilots in the military in this country than in some other countries. Many people who could not qualify for military flying in the U.S. were used by other countries where the physical standards were not quite so high. The R.A.F. was an example dur-

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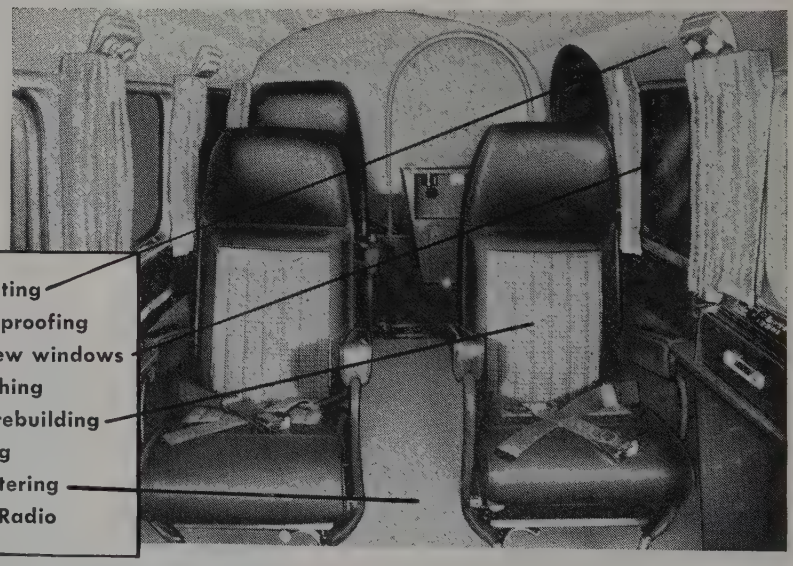

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ing World War II, and the R.C.A.F. Do you think that possibly we lost some good talent there?"

Dr. Gentry: *"There is no question about that. However, it's an individual problem. Living conditions, standards of living and such things are different in various parts of the world, and all of these factors must be taken into consideration. Some of the best pilots never wore a military uniform."*

Dr. Raymond: "I think we have come to some good conclusions in our discussion. One of them was that physical deficiency is really not a great handicap, because, provided it doesn't get beyond safe limits, experience can compensate for much of it. A pilot is safer with a compensated physical disability than he is if he is in A-1 physical condition and has a temporary disability.

"Another thing we brought out was that age is no barrier to a good pilot. Experience is a good seasoner of pilots, and the older he becomes the more efficient he is. I think, as Mr. Winter said, that even the fear factor, which most pilots experience, can be mastered by more practice and more experience.

"We also mentioned that Civil Aviation Medicine should make a separate study, to try to find out exactly what the problems of civil aviation are in comparison with military aviation. A little more time spent on these problems will give us better answers.

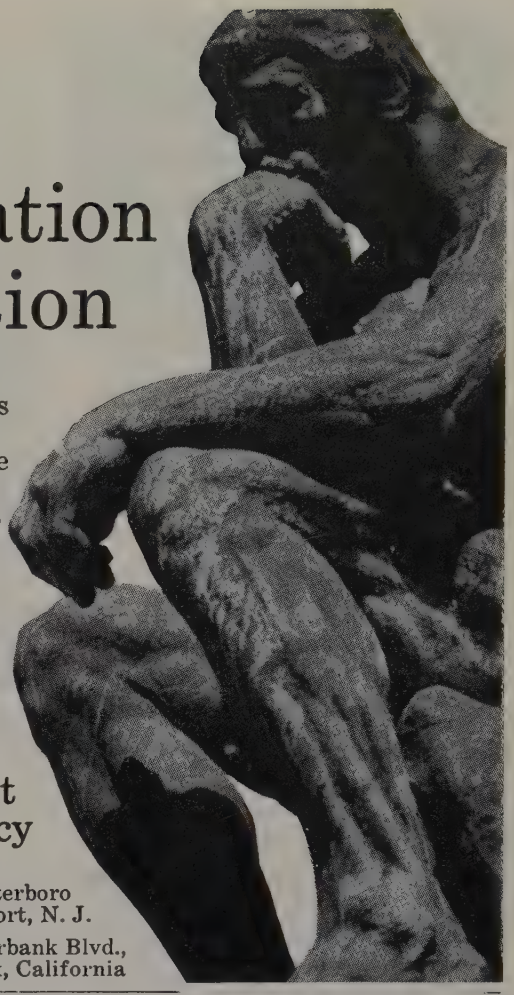
"Periodic physical examination is good insurance; it is just as important as a 'mag check' before take-off. It is the best method known to judge our reaction in time of stress.

"Proficiency is based on experience; regular flight checks are given by most of our airlines. Mr. Rosenberg's suggestion of proficiency checks on business and private pilots is left to the individual. It is for this reason that most pilots appreciate regular periodic physical examinations."

Dr. Gentry: *"By way of conclusion, I would like to say that organized flying in America owes a great deal to the medical profession. In studying the history of commercial flying you find that, in 1929, the Aero Medical Association passed a resolution that commercial pilots ought not to fly more than 85 hours a month. Members of the A.L.P.A. who know what doctors have done to prolong their useful careers, and to protect them from situations where they would be forced to fly beyond safe limits, will agree with me that the doctor is a good friend of the pilot.*

"By the same token, the safety agents of CAA are there to help pilots avoid serious situations. They do not have enough inspectors to check either the airplane or the proficiency of the pilots: they should have more money for such purposes, and we hope they will.

"We don't have the money to do the job in the medical section of the CAA that we would like to do. What I want to point out is the fact that we must improve the quality of the CAA medical examination. The CAA examiner is a specialist. He is an added safety factor for the pilot as an individual, and for the public at large."



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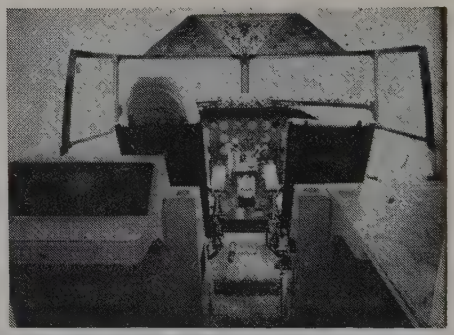

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General News

A SIKORSKY S-55, *one of the first helicopters of this type to be used by a private concern, is shown landing at The Point in Pittsburgh during a recent Pennsylvania Week Celebration. The craft was used to fly Governor Fine and Pennsylvania Week Chairman Arthur C. Kaufman from the Greater Pittsburgh Airport to the downtown business section, where they addressed a meeting of business and industrial leaders. The helicoper is owned and operated by the Rockwell Mfg. Co., Pittsburgh.*

Safe Flight Equipment in Royal Gull

Pre-stall warning equipment built by Safe Flight Instrument Corp. is now standard equipment on the Royal Gull, the 200-mph amphibian described in the Pilot's Report in the June 1956 issue of SKYWAYS.

Safe Flight also provides stall-warning for Cessna, Beech, Aero Design, Mooney, Bellanca, and Colonial.

NBAA Report Tells How Av Fuel Refunds, Exemptions are Obtained

An up-to-date summary, prepared as a service to NBAA members through the courtesy of the American Petroleum Institute, cites the ways and means and the applicable laws and regulation to obtain refunds and exemptions from those states which place a tax on motor fuel used for aviation purposes.

The report, entitled *Requirements for Refunds and Exemptions on Aviation Fuel,* is arranged alphabetically by states and gives the amount of the tax per gallon, aviation refund, refund provisions, exemption and exemption provisions. The report fills 18 pages.

To collect these refunds and exemptions, the instructions in the report must be followed, since such refunds are not automatically granted to aircraft owners and operators.

At present, 30 states and D.C., by reason of exemption or refund provisions, do not, in effect, tax motor fuel used for aviation purposes under any circumstances. Of the remaining 18 states, 2 (Alabama and Vermont) tax aviation gas at the *full state gasoline tax rates.* Six states—Idaho, Michigan, Nebraska, New Hampshire, Pennsylvania, Wyoming—tax aviation gasoline at a *lower rate* than the tax on gasoline used in highway vehicles. Ten states—Georgia, Kentucky, Maine, Minnesota, Mississippi, Montana, Oregon, S. Dakota, Utah and Virginia—grant either *partial refund* or *partial exemption* of the tax on gasoline used for aviation purposes.

New Low Frequency Homer

Installation of a Low Frequency Homer at Middletown, O., is being supervised by Flight Safety, Inc., Electronics Engineering Dept. Operation is anticipated sometime this spring. Air space has been approved, and frequency and call letters assigned.

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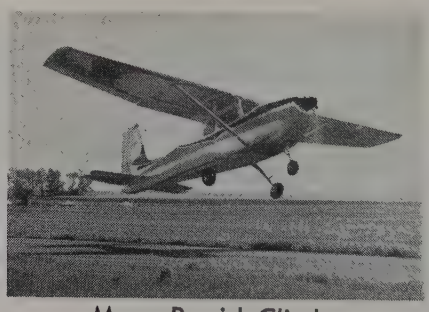

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NEW WHIRLYBIRD OFFICER *is Carl Brady (center), elected president of the Helicopter Association of America at their January convention in New York. He is receiving congratulations from Carl Agar, retiring president, and Miss Elynor Rudnick, secretary and former president of the organization. Brady is a partner in Economy Helicopters, Yakima, Wash. Agar is the head of Okanagan Helicopters, Vancouver, B.C. Miss Rudnick owns Kern-Copters, Bakersfield, Cal., which operates from Alaska to Guatemala.*

NEW "BURRO" FOR MODERN PROSPECTORS *Geologists are taking to the air in this Sikorsky S-51 to speed the search for new mineral deposits. Equipped by Aero Service Corp., Philadelphia mapping company, with an electromagnetic detector, scintillation counter, and magnetometer, the flying lab helps locate iron, copper, uranium and other minerals. The helicopter will follow terrain at tree-top height, over areas which could not be flown by other aircraft, covering more in one day than ground crews could explore in months. The improved electromagnetic detector in the helicopter was developed by the Newmont Mining Corp., and is considered an important new aid to the mining industry.*

Nationalcar, Air Taxi Conference to Cooperate in Airport Transportation

An agreement has been completed between National Car Rental System and the National Air Taxi Conference which paves the way for cooperative business development efforts by the two organizations.

Both organizations are described as the largest in their respective fields. Nationalcar provides about 10,000 rental cars to the public. National Air Taxi has more than 135 members located at about 200 of the nation's largest airports. NATC is contracted with over 25 air carriers for interchange of passengers.

Both Richard Washburn, NATC President and Charles Hillard, Nationalcar President, cite the tie-in as a natural one, explaining that both services serve the same market with different forms of transportation. Results of the cooperative effort will appear in increased facilities and services which NATC and Nationalcar can offer, and in allied promotional and advertising arrangements.

Additions to Nationalcar's coverage in 1956 amounted to more than one a week. The two latest additions are at Birmingham and Cincinnati airports. Other late additions represent 10 new rental companies with 30 offices in 27 cities.

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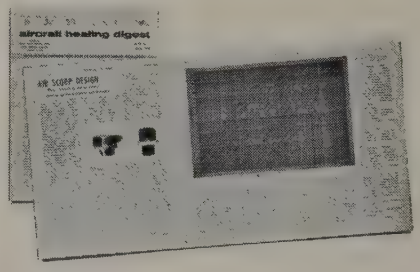
From time to time I've mentioned that you can mail a postcard to me to get your free subscription to AIRCRAFT HEATING DIGEST. But maybe you haven't yet because you don't know what it's all about . . . well sir, here's a picture of one issue.



AIRCRAFT HEATING DIGEST keeps you up to date on the newest developments in aircraft heating, gives a lot of basic information not found anywhere else, and has "how to" tips you can use. I have a column where I answer your questions . . . the tougher, the better!

Here's a rundown of typical articles appearing in the past:

AIR SCOOP DESIGN
SUPER DC-3 HEATING SYSTEM
CHECK LIST FOR HEATING SYSTEM DESIGNERS
AIRCRAFT HEATER OVERHAUL PROCEDURES
HEATER CLEANING TECHNIQUE
DETOURING THE HEAT BARRIER
EFFECTS OF WATER IN AIRCRAFT HEATER COMBUSTION AIR SYSTEM

AIRCRAFT HEATING DIGEST is good reading for anyone who owns, flys, or modifies anything from a light twin to a Globemaster. Send me a card or letter today and I'll see that you get your free subscription.

Cordially,

Joe

Janitrol Joe

Janitrol Aircraft-Automotive Division
Surface Combustion Corporation
Columbus 16, Ohio

maintenance

High Pressure Quick Disconnect For Maintenance Pneumatic Lines

A new high-pressure quick disconnect which allows safe disconnection of pneumatic lines pressurized up to 3000 psi is announced by Hydromatics, Inc. Described as the only available unit with this feature, the Hydromatic product also guarantees zero leakage under all operating pressures up to 3000 psi, and will operate in temperatures from —65° to 200° F.

With the handle in the upright position, an integral floating ball-seat valve is fully open. To disconnect the line, the handle is rotated 90° down; during this movement the valve closes and the pressure 'downstream' from the valve is automatically bled out, allowing the line to be separated without danger. The fitting at the downstream end cannot be removed while the valve is in the open position, nor can the valve be put into open position with the downstream fitting disengaged.

FSI Houston Training Center Open

Flight Safety, Inc.'s new training facility at the Old Terminal Bldg. at the Houston, Tex., airport opened for business in January. A modernized Link trainer, modified to provide automatic radio aids and realistic flight "feel" is available, in addition to professional caliber flight instruction and ground training.

Lycoming Forum

Columbus Hotel, Miami, Fla., Oct. 25, 1956

William K. Lawton *(Chairman): "Gentlemen: On behalf of the National Business Aircraft Association, I would like to welcome you all to this morning's meeting on the important subject of what makes Lycomings Lycomings.*

"I would like to introduce the members of the panel. First, on my right, we have Mr. Sterling Shimer, the Service Manager of Lycoming; on my left we have Mr. Donald Kidd, who is Sales Engineer; and over on the right hand corner we have Mr. Arthur Horst, of Reading Aviation Service.

"I would like to ask Mr. Shimer if he will start off."

Sterling Shimer *(Lycoming):* "For years, we have been primarily builders of small low powered aircraft engines, and our service requirements for those engines consisted of furnishing technical assistance to the airframe manufacturer and parts, manuals, etc. for the individual operator who is very much self-sufficient.

"Aircraft of this type were used principally for sport flying, and to a limited extent, in business. However, utilization was not too important a factor.

"With the introduction of the twin-engine executive aircraft, we at Lycoming were confronted with a new set of service requirements. I set down six of these requirements, and would like to discuss them to bring to you what we have done about them.

"Number 1, is a stock of spare parts and engines throughout the U.S.

"Number 2, is maintenance information in more detail.

"Number 3, is liaison between the operator and our engineering department in the solution of whatever problems arise.

"Number 4, is what we will do about modification programs as required.

"Number 5, is technician services to the individual user.

"Number 6, is a Service School and course of instructions for commercial operators and distributors.

"We have recently authorized 15 organizations throughout the United States to distribute for Lycoming, parts and engines. Each distributor will carry a minimum of $10.000 worth of replacement parts and engines.

"Maintenance Information: We have acquired an advanced type of electronic writing and reproducing equipment, enabling us to cut on perforated tape, service, operators' and over-haul manuals, thus giving advantages in speedier revisions at lower cost resulting in

Chairman: William K. Lawton, Executive Director, NBAA. Panel members: Sterling A. Chimer, Service Manager, Lycoming (second from right); Webster Crumm, Vice President, Lycoming Sales & Service (second from left); and Arthur M. Horst, Reading Aviation Service (left). Also participating is Donald Kidd, Lycoming Sales Engineer.

more current information for the distributor and the individual operator.

"Parts catalogs have been transferred to a system using a single interlocking card carrying the description and number of each individual part.

"There is liaison between operator and engineering. Parts which do not give the service life expected, and which are returned by the operator, are reviewed by Service, who initiates a report for presentation to the Engineering Department and Management for corrective action at weekly meetings.

"The final results of the investigation are available to the operator.

"Modification Programs: During the life of a Lycoming engine, it may become necessary to affect changes to improve the durability or reliability of the engine. It may also be desirous to initiate a field modification program to replace or re-work an individual part or parts.

"Technicians Services to Individual Operators: Our technicians and technician service, heretofore available chiefly to the airplane manufacturer, are available to the operators of twin aircraft, and the single engine aircraft, as necessary.

"Service School for Commercial Operation: We firmly believe that there is a need for a planned program of engine maintenance. Recent investigations disclose that maintenance procedures are not followed, resulting in unsatisfactory service of the power plant and adverse criticism of the engine.

"I will give a few examples of what we have in mind:

"Very recently, we had a siege of engine difficulty, and in our investigation we found that in 50% of the magnetoes, timing was in advance of our specifications, in some cases, 20° in advance of the specifications.

"Every so often in our investigations we find that the wrong type of spark plug has been used."

Lawton: *"Thank you, Mr. Shimer. I would like to point out that we are also quite fortunate in having Mr. Webster Crumm, who is Vice President of Sales and Service for Lycoming, sitting on the sidelines. So if it gets up to a high policy level Mr. Crumm here, will be at your service.*

"Mr. Kidd, will you continue, please?"

Donald Kidd *(Lycoming):*

"I think, gentlemen, that we at Lycoming are frank to admit that we have a serious problem with regard to piston burning, and as of the moment, no positive answer to this problem has been reached. I would like to assure you that the panic button has been pushed for some time, and I know that it is a number one priority item in the Engineering and Service divisions of Lycoming.

"I am sure that the users of these aircraft having our high compression and supercharged engines are not interested in alibis or apologies. We assure you that this is a difficult problem, and I trust that you will bear with us on a backgrond discussion.

"Over the past five years, both the

. . . . in the business hangar

■ Reading Aviation Service has completed their 4th installation of weather avoidance radar in a U.S. Steel DC-3. Latest installation is Bendix C-band. Special antenna mounting and dome attachment hardware designed and fabricated by Reading; radome is by McMillan. (See *Maintenance* dept., Dec. 1956 SKYWAYS.) □ Other work completed on this aircraft: completely rewired and converted to 24-v system; radio and electronics equipment modernized; Bendix TA-20 transmitter, RA-18 receiver, Collins dual omni system and glide path receiver, Bendix beacon receiver, and dual Bendix MN62 automatic direction finder were installed. Also an auxiliary power unit to permit use of cabin heater before takeoff without strain on batteries. □ Early this year Reading will be among first bases to install new RCA AVQ-50 weather avoidance radar, the first designed for the light twins.

■ Executive Aircraft Service, Dallas, has completed 50-hr. inspection and misc. repairs on Tenn.-Eastman's DC-3. Lee Boyd is Pilot, Ralph Bailey is Co-Pilot Mechanic. □ Bill Dameron, Pilot, and Al Hicks, Co-Pilot and Mechanic, had the Sears, Roebuck DC-3 at EAS for overhaul of right main fuel tank, installation of new tires/tubes on main gear, and misc. repairs. □ Ed Armstrong, Chief Pilot, and Jim Smith, Pilot, brought S.W. Richardson's Fort Worth DC-3 to EAS for 100-hr. inspection and repairs. □ Holley Carburetor's Detroit DC-3 is in for annual inspection and misc. repairs. O. E. Sparks is Chief Pilot. □ Inspection and repairs on Tecon Corp's Dallas DC-3. □ Charlie Baudoux, Pilot for S. B. Burnett estate, Fort Worth, brought their Lodestar to EAS for landing gear overhaul and other repairs.

■ Hawthorne Flying Service, Charleston, S. C., has just completed extensive radio and instrument installation in D50 Twin Bonanza owned by Stockton Whatley Davin & Co., Jacksonville. Entire factory instrument panel removed and new instrument radio presentations engineered. □ With the Twin Bonanza back in service, the SWD & Co. Super 18 is at Hawthorne for double engine change, propeller overhaul, complete instrument overhaul, and installation of new ARC ADF-21 and a Collins 51X-1A 360-channel receiver.

■ Dallas Aero Service has the Ray Smith Transport Co. Lodestar in for major overhaul, including tank resealing, complete modernization, rewiring, new radio installation, repainting, new interior and installation of a picture window. Pilot is Al Phillips. □ Overhaul completed on CAA's Oke City DC-4. □ 100-hr. inspections on the following: Olin Mathison Twin Beech from Monroe, La., Jack Tarver, Pilot; Pioneer Aero. Corp's. Martin 202; T. D. Humphrey Twin Beech; Colonel Nolds' Lockheed 12; Sun Pipe Line's Aero Commander, Pilot Gene Reger; Fort Worth Pipe Co.'s Aero Commander. □ Massey-Harris-Ferguson's deHavilland Dove from Racine flown to Dallas by Pilot L. V. Brandhorst for single engine change, prop overhaul, new instrument panel and radio installation. □ Pilot Ray Vertol has Signal Oil's Aero Commander at DAS for installation of Zep Oxygen System and other modifications. □ Smith-Douglas Lodestar from Norfolk is at DAS for tank sealing, radio and other repairs, C. B. Owen is Pilot. □ Sinclair's deHavilland Dove, based at Tulsa, is at DAS shops for spar modifications. □ E. Taylor flew G. W. Crothers' deHavilland Dove to DAS from Toronto for engine overhaul, installation of air-stair door, new interior, auxiliary tank installation, prop overhaul and 1600-hr. overhaul. □ Spar modification, single engine overhaul and prop overhaul for the Bank of Mexico's deHavilland Dove, based at Mexico City. □ Anchor Metal's Aero Commander from Hurst, Tex., for radio installation and exterior painting. □ Pilot Bill Toler brought Chicago Corp.'s Commander 680 from Ft. Worth for installation of dual hydraulic system, exterior painting, flow meters and other modifications. □ Convair Corp's 680 Commander in for 100-hr. inspection and flow-meter installation.

■ Grand Central Aircraft Co., Glendale, is completing a 14,000 inspection, engine changes and misc. other work on Atomic Energy Comm. C-54. Partial tank resealing being performed by Aircraft Tank Service. James Bixler, Chief Pilot, accompanied by Vern Reaser of Carco Air Service and B. N. Perkins of AEC. Grand Central also overhauling one of Pacific Northern Airlines' DC-4's, including modification of electrical and radio systems. Aircraft Tank Ser. is doing complete tank reseal. Capt. Frank Hansen ferried DC-4 to Glendale accompanied by PNA Chief Inspector.

■ Southwest Airmotive, Dallas, is completing single engine change and other work on Waterman Steamship Lines' Lodestar, Bill Correll Chief Pilot. □ Trice Productions' Jim Sinex brought his D18S in for periodic check. □ Pilot Tom Smith brought Shamrock Oil and Gas Co.'s Twin Beech in for double engine change. □ Pilots Paul Holst and Norman Joyce brought Michigan Tool's Lodestar in for installation of Firestone fuel cell and Southwind heater. □ Lockheed Aircraft Pilot Jack Norton and Mechanic Bud Parsons brought their Lodestar in for 100-hr. inspection and other work □ More and more planes at SAC for compliance with AD 56-23-2 on 985 engines. □ First pilot to arrive on SAC's new ramp at Hangar 2 was Magnolia's Jim Martin in the company's Luscomb. □ Child's Grocery Pilot Johnny Dawson arrived in the recently-refurbished Beechcraft for 100-hr. inspection and double engine change.

■ Roscoe Turner Aero Corp. is working on the Super 18 Beech of Inland Container for Ed Manning, av. manager. Work includes: installation of dual Wilcox ADF, Wilcox 440 Transceiver, ARC T11B Transmitter, ARC omni, Flite-Tronic MB-3 receiver, R89B glide slope, Lear L-2 autopilot with altitude control, ARC CD-1 course director system, F11 isolation amplifier, and Grimes rotating beacon.

(*Continued on page* 52)

airframe and engine manufacturers have recognized your increasing demand in medium sized, twin engine executive aircraft for increased performance, to such an extent that we might, in the next five years, have these aircraft very closely approaching transport category requirements.

"An analysis of the model changes of these aircraft will show that we have provided increases in performance, which mean useful load, rate of climb, and cruising speeds, with small increases in empty weight. This is a logical and practical way to accomplish your desires, and infers that we in the small engine field must constantly be increasing the specific horsepower per pound and per cubic inch.

"Gearing was the first step, followed by increases in compression ratio to use 100 octane fuel, and in time, the use of supercharging.

"It would appear, in a very loose sense, that our trouble began with the requirement for 100 octane, or high leaded fuels. The use of high leaded fuels, we feel, is contributing, and I underline *contributing*, to our problem, but is necessary to provide the performance you are demanding in these executive aircraft.

"As a matter of interest, the specific output in horsepower per cubic inch of the GSO-480 engine, at normal rated power, is equal to that of larger engines currently produced by Pratt & Whitney and W.A.D., putting us in the position of having to develop and apply our engines in the same manner as these major engine producers.

"It has been my observation that we have subjected the supercharged engine to engineering test programs in Lycoming's laboratory, as well as in the airplane manufacturer's test airplanes many times in excess of that required of the lower specific output engines. But, as history will record over many years of aircraft development, problems will arise in the hands of the user which are often difficult, and on occasion, nearly impossible to duplicate in the laboratory.

"To indicate our problem, the few burned pistons we have had in the laboratory were occasioned by operation at abnormally lean mixtures at high power.

"Our basic problem is that we can determine no positive pattern or cause, but are taking steps to introduce improvements which we hope will reduce the sensitivity.

"To be very frank, gentlemen, we need all the help we can get. I hope that we will be in a position in the near future to solicit detailed comments on all events related to servicing, operating schedule, and so forth, preceeding any failure you may have had. If you would care to take the time, write our Service Department regarding any clues and thoughts relating to your problems or your neighbor's problem, and we will be sincerely grateful.

"I would like to suggest a few considerations related to the field operation of those high performance engines. These are observations and are not intended to justify the condition that exists.

"1. We must continue to emphasize that the grade of fuel specified on the aircraft is the minimum grade fuel. You are encouraging disaster to use a lower octane fuel at any power setting down to the lowest recommended cruise power and r.p.m. The popular conception that lower grade fuels can be used by restricting manifold pressure, will not work, because of the fact that the carburetor is set at a lean limit to give range. For us to richen the carburetor to permit operation with lower octane fuels, would probably decrease the range up to 25%.

"Have you pilots noted the color of the fuel to see if it is green, signifying 100 octane? One field servicing person admitted using 91 octane fuel with no regard to the marking on the aircraft.

"2. Extreme care should be exercised by your maintenance personnel to adhere strictly to all manufacturer's recommendations. This applies to valve clearance, magneto timing, spark plug check, air filter servicing and similar routine procedures.

"3. Use only standard, straight mineral aircraft oils with the seasonal grade suggested in the operator's handbook.

"4. Do not, under any condition, experiment with different spark plugs. We know of one case where a man was using in a high compression engine the C.26S Sparkplug without regard to our recommendations.

"For your advance information, we intend to release a directive, very shortly, specifying that the AC. SR.83P as the only approved spark plug for the high compression and supercharged engine. This plug is immediately available in the supply system and should be installed at the earliest possible moment.

"Again, we emphasize, there is no other approved plug upon the release of this directive.

"5. Under no condition make any adjustment to the carburetor, with the exception of the idle, air and fuel, except at authorized carburetor facilities having suitable flow batch and manufacturer's chart. In flight, use of the mixture control with carburetors having A.M.C. should not be considered under any condition other than at altitudes above the critical altitude of the A.M.C. unit itself. They will be in all new engines.

"6. This final suggestion might provoke comment both from our good customers and you as pilots and operators. Fly only at the manifold pressure and r.p.ms. shown on the power control chart, recognizing the transitional procedures and minimum air speeds recommended by the aircraft manufacturer for desired engine cooling. These are the conditions at which the majority of laboratory and flight testing has been successfully accomplished. Under no condition exceed the maximum manifold pressure indicated under a given engine speed.

"So as not to be adamant, if these operating conditions do not permit your desired utility, permit the airframe manufacturer to receive your suggestion, and if valid, these charts can be revised or extended."

Lawton: *"Mr. Crumm, have you any comments to make about the future of Lycoming?"*

Webster Crumm, *(Lycoming):* "I want to discuss one point.

"We do need information—experienced flight information and operating information—to add to our engineering background. We find that you can spend literally hundreds of thousands of dollars in laboratory work on aircraft engines, but until you get them in the air, you do not get all the answers."

Dale B. Olsen, *(Aurora Gasoline Co.):* "With regard to the r.p.m. and manifold for the chart, does that mean we can not interpolate for say, 70 percent power if we so desire, or do you want us to stay at 65 or 75?"

Shimer: "If 70% power is a desirable range of operation, and it provides you with something you need in terms of performance, that 75 or 65 won't provide, then I feel that probably it is up to us and the airframe manufacturers to establish the conditions of operation at 70 percent power. That is why I say, we don't want to be adamant about this, but on these particular points we have done a lot of investigation in regard to the carburetor performance and operation at these specific r.p.ms. In the range of 75% and below, we, the engine manufacturer, are not quite so concerned if you would interpolate between those. What we are mostly concerned with is the operation between 75% and 100% power."

Chris Chaffee, *(Champion Spark Plug):* "We have had magneto problems with our engines, and I understand there is an approved magneto for the G.O.435 C2 engine. Is that correct?"

Kidd: "That is correct. I believe we have available kits which include what we call the light weight magneto. It affects a 6-lb. weight saving in the engine, as I recall, but it does require that the harness be changed as well.

"Service experience has indicated this so-called light weight magneto has given a better account of itself than the older design, heavier type magneto.

"In regard to magnetos, I might go one step further. We are currently experimenting with what we call a double breaker magneto. The reason for this double breaker magneto is to get rid of the impulse coupling. Any mechanical gadget, as long as it is mechanical, is always a source of possible trouble. The double breaker magneto is simply a second breaker included, which is timed to retarded position. Starting will be accomplished through this second breaker and booster coil. The moment the engine becomes operating, we switch off this second breaker and booster coil system."

Harold Johnson, *(Whirlpool Siedger Corporation):* "We have had a couple of problems with our airplanes on the 40 F 6 engines—through bolts. We have broken eight now. We are averaging one every ten days and have just a

little bit of trouble keeping the airplanes in the air."

Lawton: *"What type of airplane do you have?"*

Johnson: "C.50's."

Kidd: "Well, very frankly, I'm not enough acquainted in detail with this problem. I hadn't realized that you had been unfortunate enough to have 8 of the things go.

"Have you received any comment from Lycoming Service Department about possible corrective action?"

Johnson: "Well, we called Lycoming half a dozen times, I would say. About three weeks ago they sent us some new type, a neck down stub. Now we have two of those replaced and I was wondering if that was going to be the answer, because, right now, we are in the process of overhauling two of our engines, and I understand that the neck down stub will be in it. I wonder if that is going to remedy the troubles."

Kidd: "I would say based on an engineering point of view it should rectify the problem of bolt breakage."

Shimer: "I would like to comment on that, if I may. We had that problem and have come up with the neck through bolt. I believe there will be a bulletin out on that very shortly and that at the first overhaul. all of the solid bolts will be replaced by the neck-down through bolt."

Lawton: *"Any more questions?"*

Johnson: "One more. How about a base seal? Have you experimented with that?"

Shimer: "Yes, they are experimenting with new cylinder base seals. Of course, a cylinder base seal is quite a tricky seal, and every once in a while you do get into some trouble with them. I believe the Engineering Department will come up with a new type seal very soon."

Chuck McKinnon, *(I.B.M.):* "I would like to ask Don if, in the pattern of piston troubles that you have had, there have been any particular cylinder or cylinders, or is it an overall spread through all six cylinders in the engine?"

Kidd: "Very definitely an overall spread. There is evidence in every case of piston burning, indications that either detonation or pre-ignition exists. Do you have failures through all six?"

McKinnon: "That's right. We thought we had it localized into a couple of cylinders at one time, but that has long since been changed."

[*Ed. Note: See Lycoming AD note 57-2-2 at end of panel.*]

Abe Ludden, *(Central Soya Company, Inc.):* "We are operating one C.50. We also had one through bolt failure. However, in the winter time we have a lot of condensation. How do I know whether that is a characteristic of the engine or the installation?"

Kidd: "May I ask where the condensation is observed? In the oil?"

Ludden: "That's right. For every flight we can get about approximately one quarter of a cup of water out of the quick drain."

Kidd: "Sounds like we've got some consideration here in regard to our crankcase breathing system. I don't know what the problem is."

Shimer: "We have heard of a few cases of that, and we have turned it over to the Engineering Department. They have not come up with any answer to it as yet."

Kidd: "Well, Del Spillman is sitting right here. He is very close to this installation problem. Would you care to comment, Del, about that?"

Del Spillman, *(Beech Aircraft):* "We have observed the condition. It has been reported to us. I observed it on several of the airplanes, and it appears to cause no particular problem."

Kidd: "You will appreciate, gentlemen that there is always a certain amount of condensation generated, but I am very frank to admit that I have never heard of a report of a quarter of a cup on each flight."

Chris Chaffee, *(Champion Spark Plug):* "We're operating the 4 G.O.435 which I imagine is a different model than these other boys are using. But we are also experiencing that same problem. Possibly not quite as much, but I find it pretty well throughout the engine also, and I would like to also direct a question to Beech.

"Our engines are in a B.50 and in the winter time we have great difficulty in keeping temperatures up, and it seems up there is too much flow of air through there."

Lawton: *"Any comment from Beech on that?"*

Spillman: "This is true. We have had this reported previously, and we had made arrangements with Lycoming to extend the green line to a lower limit. I believe that was given to you in a bulletin."

Chaffee: "We are experiencing temperatures so low that the engines will not operate, and our green line is 300°, I believe. We are running temperatures as low as 240°, and at those temperatures that engine will just barely run."

Spillman: "Could you comment on power settings for these temperatures?"

Chaffee: "About 65% to 70%."

Spillman: "Outside air temperatures when these conditions exist?"

Chaffee: "Extremely cold. 10° below and around zero."

Spillman: "We have had reports of lower temperatures, but nothing that compares with what you are telling me now."

Chaffee: "We have never had any problems with high temperatures; in fact, through the summer, our engines will just barely run over the green line."

Spillman: "I think that is the general experience, that the engine is very well cooled."

Chaffee: "Yes, extremely."

Lawton: *"Thanks Del. Joe Lacey?"*

Joseph Lacey, *(Sinclair Refining Co.):* "I don't know anything in particular about Lycoming engines. However, engine manufacturers have told me that if you have water in your oil, you should run your oil hotter."

Kidd: "I can't argue about that. It is

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true. I think that with thermostatic regulation on the oil coolers we tend to maintain manufacturers' recommended oil temperatures. I know on the small single engine aircraft we have sometimes found it necessary actually to block off part of the oil cooler, at least under very severe cold weather conditions."

McKinnon: "I would like to know from the Lycoming people if there have been any serious problems reported in the field from the G.S.O. on surging on the ground during taxiing run-up? About 5 times I have had the G.S.O. return to the blocks with very rough operation in surging, and have been unable to tie it down until just recently. I had the condition occur during one of my own taxi out and run-ups. It turned out that it's an organing effect—that there's a beat off the pot into the air scoop. The temperature and humidity in the ones that I've tied down in which I can reproduce this condition is around 65° to 70° with relative humidity around 70%.

"This particular day I could reproduce it at will on either engine. It turned out that all you have to do is put your hand on the carburetor heat and as soon as you start to pull it, this upsets the organing effect and straightens it out."

Kidd: "Would you be kind enough to tell us at what r.p.m. and manifold pressure this occurred?"

McKinnon: "Yes, it occurs at an r.p.m. of the normal run-up range, and a manifold pressure of 15 to about 26 inches. The effect is almost a duplication of the rise in manifold pressure and decrease in r.p.m. R.p.m. will come down to 1500 and manifold pressure will go from 15 inches up to about 26 inches. The two rock off against each other and gives the impression of mag trouble—just a complete beat on the engine."

Kidd: "Frankly, I've never heard of this condition existing down in this operating range. It's a new problem. It may be wise if we get in touch with you some time to see if we can check on some of these details."

McKinnon: "If my memory serves me correctly, this surging is a function of the compressor, and some condition which has been produced here is affecting the compressor operation.

"By opening the heat valve you changed the pressure temperature entrance conditions to the supercharger and put it on an entirely different point on the compressor map. We can do this artificially in the lab with improperly designed compressor inlet characteristics and operation under unusual manifold pressure and r.p.m. conditions."

Lawton: *"One of the great points in N.B.A.A. membership which we are striving each and every day to encourage is the free interchange of this type of information, not just at our meetings but throughout the year. If you do have problems, if you are writing to the factory, and get a reply on something of this nature that Chuck McKinnon has brought up, I wish you would take time to forward a copy of the correspondence to Skyways for the Maintenance department.*

"I would like to ask Arthur Horst from Reading Aviation Service to comment, if he would, on some of the major squawks that he and his organization have handled."

Arthur M. Horst, *(Reading Aviation Service, Inc.):* "I'm afraid I don't have any ready-quick solutions, and our particular line squawks that we encounter, have actually not been in any set problem or set pattern.

"The G.S.0480, is of course, a very new engine, and we are all, I know, very happy to see Lycoming pioneer in this field. Of course, we all have these problems that we discussed here today, and as far as an operational standpoint goes, I think that it's of great importance that Lycoming re-emphasize to the operators the correct operational use that was discussed this morning. We hear all kinds of explanations from people who come into our shop, on how to save fuel because they climb at less than the 80% recommended. We found that that particular horse power setting, 80%, or we are actually using 87%, on the 40 inches and 3,000 setting, does use a lot of fuel. But you get up there in a hurry. We found people, experimenting with lower power settings to get away from that high fuel consumption, and I might add, we were duped into trying the same thing, and found that having the airplane at a lower power setting only results in a rapid loss of plug life, because of the higher temperatures that you are getting into by closing your rich jet 80% mixture.

"All these things should I think, be more fully detailed and emphasized by the manufacturer. It will enable us as fixed base operators to pass the information on to our customers so that they operate the engines correctly."

Lawton: *"Thank you. I think that observation about using power charts is particularly true. I believe that through the use of the power plant chart, some of our problems be eliminated. It is just a matter of good operation that we should be encouraged to use them more frequently.*

"I would like at this time to thank Mr. Crumm, Mr. Shimer, Mr. Kidd and Mr. Horst for their cooperation.

"I believe that Lycoming's program of having factory training and having the service people trained in the field, which is being rapidly implemented, will keep our airplanes flying with a lot less engine trouble than we apparently have been having."

CAA AIRWORTHINESS DIRECTIVE 57-2-2 LYCOMING

(Applies to all aircraft incorporating Lycoming GO-480-C series or GSO-480-A series engines.)

COMPLIANCE REQUIRED AS INDICATED:

To reduce the possibilities of encountering piston burning, the following must be accomplished:

1. Prior to next flight and every 50 hours thereafter, check the linkage of the mixture control arm to insure that the lever arm on the carburetor is in the full rich position when the cockpit control is set in this position.

2. Prior to next flight the following placard must be placed in a prominent position on the instrument panel or control pedestal:

"This aircraft must be operated with engine mixture controls in the *FULL RICH* position under all operating conditions. Manual Leaning is not permitted. Move the mixture control out of FULL RICH only when stopping the engine."

3. Compliance required by February 25, 1957, and thereafter any time an engine is changed or any part of the aircraft or engine induction system is altered.

Flight check at 65% normal rated power in level flight to insure that the fuel consumption of each engine is within the limits specified on the Lycoming Power and Fuel chart for the particular engine model. This check may be conducted with an accurate fuel flowmeter or by any other accurate method of determining actual fuel consumption. Engines which do not conform to these limits will not be considered airworthy until the carburetor has been readjusted to provide the specified in-flight fuel flow. Carburetor flow bench readings are not acceptable.

In addition to the above, further recommendations to preclude piston burning are contained in Lycoming Service Bulletins Nos. 215, 218 and Lycoming Letter to all owners and operators, dated January 28, 1957.

Increased Latin American Sales Possible with New Credit System

The possibility that improved credit arrangements now under discussion may result in increased sales of U.S. civil aircraft to Latin American nations was voiced recently by Mundy I. Peale, Pres. of Republic Aviation Corp. and honorary chairman of AIA.

According to Peale, the prospects for improved credit relations are "bright." "The preference for American-built aircraft is overwhelming," he said. "Only the knotty problem of dollar shortages hinders the acceleration of trade with our Latin American neighbors."

He pointed out that U.S. aircraft manufacturers are not in a position to handle the financing of the planes they produce. "The aircraft manufacturers' ratio of profit to sales is well below the all-industry average. And the aircraft builder must reinvest a substantial portion of these marginal earnings in research and development to keep pace with his competitors in a rapidly advancing industry."

Peale suggested the greater use of chattel mortgages for U.S. planes purchased by Latin American countries. Such mortgages should be adequate protection, he said, because aircraft costs have been continually sustained in resale prices.

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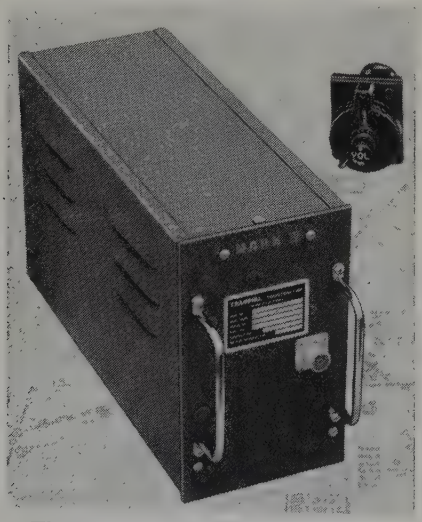
MHF Transmitter-Receiver

A new medium-high frequency transceiver weighing less than two gallons of fuel promises to fill a long existing need for the manufacturers and operators of business and transport aircraft. Designed to meet air carrier specifications, its high power output permits two-way radio contact under normal atmospherics over a radius of 500 to 2500 miles. This is extremely important new equipment for all aircraft being flown internationally, and for aircraft used in such areas as South America and Canada, where stations are scarce and widely scattered.

Announced by Transvaal Engineering Corp. of Culver City, Calif., the transmitter, receiver and power supply are all contained in a ½ ATR case that weighs less than 12 pounds. Named the TRANSVAAL MARK IV, the new MHF aircraft transmitter-receiver is of a revolutionary design embodying the use of transistor circuitry that eliminates the less dependable and heavier vibrator or dynamotor. The MARK IV is about three times smaller and 15 pounds lighter than the nearest equipment now in production.

The MARK IV is so constructed that it may be installed in the most convenient location in the aircraft. A single electrical cable connects the radio to a small remote control head located anywhere in the cockpit.



The new Transvaal unit has a frequency range of from 2 mc. to 10 mc., with 6 each crystal controlled transmitting and receiving channels. Transmitter power output is approximately 35 watts into quarter wave antenna. Receiver audio output is 10 watts. Receiver sensitivity is 6 db. S. to N. at 5 microvolts. Power consumption is—receiver 1½ amps, transmitter 7 amps, at 13.75 volts.

Agricultural Flying Training Course Opens Soon at S. D. State College

The first annual Midwest Agricultural Pilot Training Course, designed to train commercial pilots in the aerial application of agricultural materials, will be held at South Dakota State College, Brookings, S.D., from April 1 to April 27. The course is offered at the request of the aviation industry of South Dakota.

The course, which was recently shortened from an original 6 weeks, is divided into two equal parts. One will cover flight instruction and field operation while the other will cover classroom and laboratory instruction conducted by technical agriculture staff members from State College.

It is possible for a person enrolling to take only the ground work, which will be available for a greater number of participants. This will include airplane care and service, calibration of equipment and pattern measurement, insect control and safe handling of chemicals, weed and brush control, defoliating and desiccating, seeding and fertilizing, plant disease control, laws and regulations, and customer relations. The enrolee may take the ground training in conjunction with air experience; he will receive 30 hours in either a Piper or a Stearman. Experienced applicator pilots may take an abbreviated flight course of 15 hours or less as needed to pass requirements in each maneuver.

Co-sponsoring groups with State College include the State Aeronautics Commission, S. Dakota Aviation Trades Assn., and CAA.

Applications are being accepted until March 14, 1957. Further information about the course, including costs, rooming facilities, etc., can be obtained by writing to Ralph W. Lindsay, Jr., Air Coordinator at the College.

The course was designed by Gale F. Hanson, CAA official, and Fred E. Weick, head of personnel aircraft research center at Texas A & M. The course was offered twice at A & M, the second time early this winter.

Louis Blaisdahl, CAA aviation safety agent from Rapid City, S.D., attended the second Texas course and will direct operations at South Dakota.

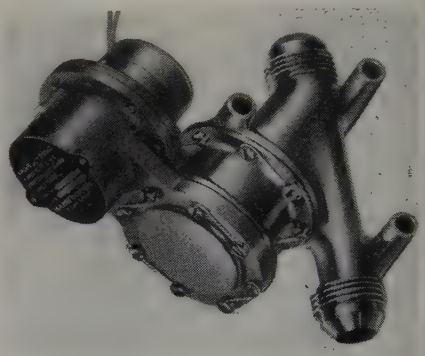
The recently announced shortening of the course provides economies in decreased living expenses at the College and less time off the job. The short course is reported identical with the original, with all the same material and the same amount of practical training. Use of weekends for flight training and of a new textbook gets the same material into a shorter time.

Half-Inch Electropneumatic Valve, Magnetic Amplifier Control Box

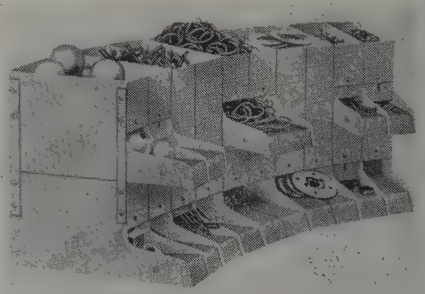
Recnt addition to the line of aircraft controls by Barber-Colman is a ½" electropneumatic poppet valve featuring very low pressure drop particularly good for high operating temperatures.

The valve is designed for fail-safe operation to open or close position on loss of electric power and to close on pneumatic failure.

From the same manufacturer comes



news of a new magnetic amplifier control box which permits multiple isolated control circuits with imput circuits completely isolated from output circuits. Insensitive to normal shock and vibration, the new equipment eliminates the expense and weight of shock absorbing devices. Magnetic amplifiers are more resistant to momentary overload than electron tubes, and eliminate need for warm-up time and standby power requirements.



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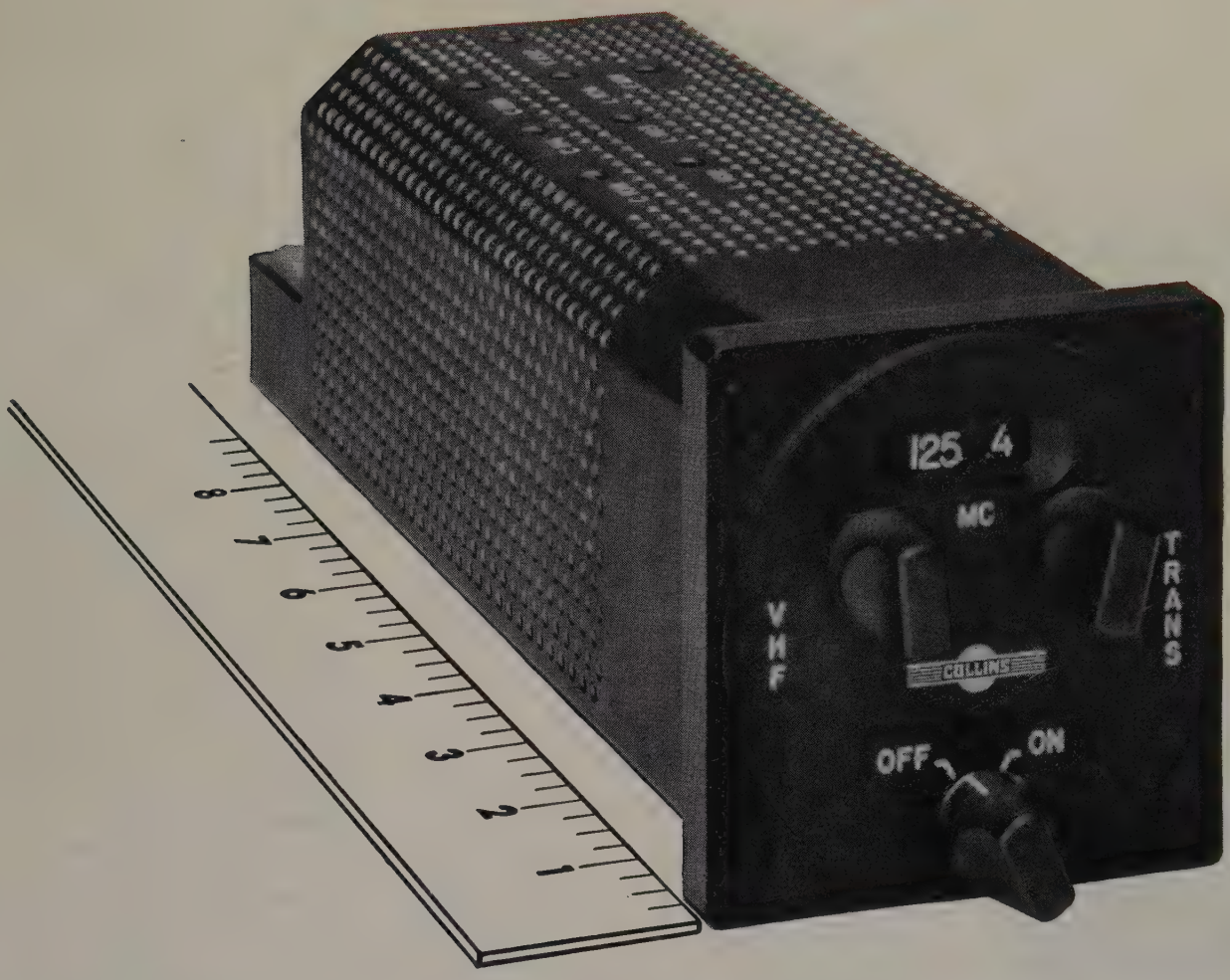

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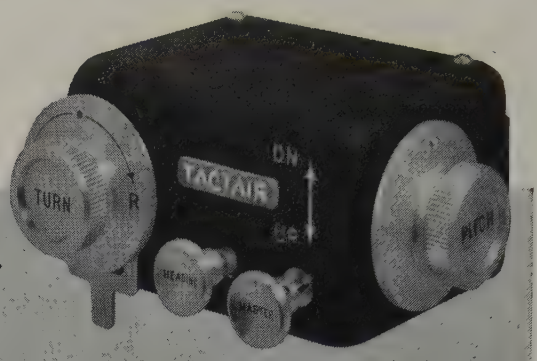

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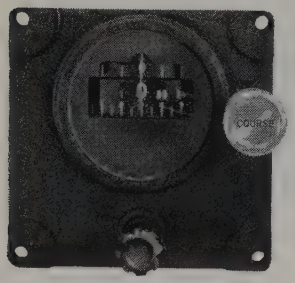

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Air Your Views

(*Continued from page 7*)

purposes of good public relations, if for nothing else. Without some data to give the tower, I can't get the information unless the company pilot has filed a flight plan. There seems to be a reluctance on the part of company pilots *to file VFR flight plans* at any time. This is probably because of the trouble involved in closing them at uncontrolled fields. However, in controlled fields, such as ours, it would be of considerable help to us to be able to get an estimate of arrival. We would be able not only to inform the waiting personnel, but *we could plan the parking arrangements* of the aircraft on our apron.

Actually, the ideal situation would be for the pilot to phone me before departure. I would not hesitate to go out of my way to make provisions for transportation, make phone calls, even hotel reservations, if I could at the same time learn from the pilot his ETA, how long the plane will occupy our limited parking space, and whether fuel service will be needed. Many times some of the above information is telephoned to a company official downtown, but *he fails to inform* his chauffeur or *the airport manager.*

Perhaps in the above thinking I'm moving into a realm of operation that at most other fields more logically belongs to *fixed base operators.* In our case, however, it is the responsibility of my personnel to handle all unscheduled planes that land at Patrick Henry Airport.

We welcome the business your members are giving us and we are trying to anticipate an appreciable increase in 1957. We may be faced with a tremendous problem this coming Spring and Summer when the 350th Jamestown Festival attracts a multitude of business aircraft to this field. Anything you can suggest to help us serve your members will be greatly appreciated.

Sincerely yours,
Eugene C. Marlin
Airport Manager

Mr. Ralph Piper
Monsanto Chemical Company

Dear Mr. Piper:

I have just finished reading the very interesting article in *Skyways* covering your speech at the recent NATA Meeting.

I was particularly amused by your indication that you would give everyone at the meeting a silver dollar for the number of times you had had your windshield washed in the preceding two years without specifically asking for it. I certainly do wish that in this two year period you had stopped at Dixie Air Associates on one or two occasions because it would have necessitated a slight additional exception to your statement in that you would have had to have excluded Dixie Air in Memphis as well as your home base.

I do hope on your next visit to Memphis, Mr. Piper, that you will try the service and facilities of Dixie Air Associates.

And in closing, let me agree and concur with you in your impressions as regards the needs of the business pilot.

DIXIE AIR ASSOCIATES, INC.
Dal C. Miller
President & General Manager

ARDC Instrumentation Report

A newly released ARDC technical report points up the urgency for new thinking in aircraft instrument development and panel displays, and outlines a number of carefully chosen guidelines in this field. Publication of the report anticipates a comprehensive Industry-Armed Services conference scheduled at WADC for spring 1957.

Compiled by the Wright Air Development center, *The Air Force Program for Improved Flight Instrumentation* describes the work of ARDC's Control-Display Integration Working Group, which coordinates all activities providing input to flight control instruments, systems and equipment. It also emphasizes the need for instrument development which considers integration into "whole panel" presentations as well as the necessity for presenting information in the same terms as the control action the pilot must take. The report is illustrated with examples of "old and new" instruments displays.

The report is available to the public through the Office of Technical Services. Dept. of Commerce; it should be ordered by the following code: WADC Technical Report 56-582.

Van Dusen Acquires Eastern Airmotive

A merger has been announced between Eastern Airmotive Corp., Richmond, Va., and Van Dusen Aircraft Supplies by George R. Galipeau, Van Dusen General Manager.

The new facility, including offices, showroom and warehouse, continues to be located at Byrd Field (Richmond Municipal Airport), site of Eastern's operation for the past 10 years. The unit will be known as the Southern Division.

George Tucker remains at Byrd Field as manager of the new division. Other Eastern staff members who remain at the new division as flying salesmen include Davis Mellor and H. Roy Sullivan.

Other Van Dusen operations are located at Alexandria, Teterboro, Minneapolis, Chicago and Boston.

RMBAA Elects New Officers; Labe Outlines Purposes, Problems of Group

The Rocky Mountain Business Aircraft Association, a local organization working vigorously for the development of business flying in that area, has announced the election of R. C. Van Buskir as Chairman, Ed Tepper and Ed Calahan as Vice Chairmen, Louis Labe as Secretary, J. Grant Robertson as Treasurer, and Lou Scavello and J. A. Johnston as Directors.

The RMBAA is currently advocating a Metropolitan Airport Authority for the Denver area and a State Aeronautics Commission for the State of Col.

On Dec. 20th, 1956 Louis Labe, newly elected Secretary of the Association, addressed members of the Aviation Committee of the Denver Chamber of Commerce in order to explain some of the purposes and problems of the Association, and in doing so gave evidence of business aviation progress that is of interest to everyone in the field.

Organized in 1953 "to represent the owners and operators of business aircraft in the Rocky Mountain region," the RMBAA now represents 52 companies, and individuals operating aircraft for business. Since its formation the Association has made several contributions to local aviation, including improvements in CAA control and weather facilities at two locations in Wyoming, initiation of a move to obtain a Special Service Frequency for business aviation, and successful efforts to permit private capital to build hangars on Stapleton Airfield, and to cancel a proposed landing fee.

Secretary Labe observed that "executive aviation was born of necessity. There are over 6000 airports in the U.S., and the scheduled airlines only stop at about 600, that is, just 10%. How can these people get to the other 5400 (or 90%) if they have business there? Companies find that by operating their own aircraft they can get to any city and

(*Continued on page* 52)

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Immediate delivery. Freshly overhauled airframe, props, and engines (with crankshaft modification), new interior, new exterior paint. Light weight, late model. Omni, VHF, ADF, etc.

Grumman Gooses

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(Continued next page)

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SKYWAYS
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RMBAA New Officers

(*Continued from page 49*)

town having an airstrip . . . independent of schedules and airline delays." Labe went on to cite a gear manufacturer whose orders increased from $30,000 to $300,000 in a single month when they announced 24-hour air-delivery of rush orders.

Noting a 300% growth in business flying since 1946, Labe added that, in 1953, when the RMBAA was first organized, there were only 69 business aircraft on Denver's Stapleton Airfield. By 1956 the number had increased to 206. In the state of Colorado, by 1956, 516 aircraft had been added to a 1953 roster of 784. Since 1949, business aircraft movements at Stapleton Airfield have increase by 75%, hitting a record high on May 8, 1956, when there were 236 business itinerant movements and 191 air carriers.

Labe also emphasized the value of business aviation even to those who do not superficially seem to profit from it, saying, "A survey of the membership of our Association in 1955 was obtained from 35 companies who operate business aircraft and are based in the city of Denver. These figures are very revealing: three quarters of a million dollars was spent for maintenance, gas, oil, services, etc. The annual payrolls of these companies . . . exceeded $24 million and they employed over 4200 people. I will not try to say that all this is spent in aviation, but these companies have located here because they were able to establish headquarters where they could base aircraft to reach out to the places they had to go. The Rocky Mountain area is rough country. Aircraft give them the ability to get around to the outlying places, where they might have had to set up offices if aircraft had not been available. The above figures show that *each aircraft based in Denver for use by business firms brings in an average of $21,000 annually to the businessmen of Denver.*"

Although these arguments were advanced by Mr. Labe to improve business aviation facilities in one area of the country, they indicate that a survey of the values of business flying, whether conducted on a national or a local level, consistently prove the economic soundness of business aviation.

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In the Business Hangar

(*Continued from page 41*)

■ Remmert-Werner, St. Louis, reports on multi-engine business planes: ☐ Bill Watt brought Hoover Co.'s DC-3 to Pompano Beach for center section attach angle modification. ☐ Bill Lawrence and Bob Cantarra brought Air Reduction DC-3 to Pompano for installation of Edison Fire Detection System. ☐ Fruin-Colnan Contracting Co. Lodestar had a double engine change at R-W, STL. ☐ George Strake's Super-92 DC-3 brought to STL by Lynn Carney and Charles Ottosen for installation of fresh deicer boots, new exterior paint. ☐ Bill Rosta brought the John Galbreath Lodestar to R-W for new interior, installation of oxygen system, auxiliary cockpit and windshield heater, dual Wilcox 701 lightweight ADF, Collins 51R3 VHF receiver, Wilcox 702 marker receiver, ARC custom instrument panel, rewiring of elect. system, exterior paint.

☐ Bill Ashton brought the Detroit Steel DC3 to Remmert-Werner in Toledo for complete electrical wiring, propeller overhaul, installation of Winslow Oil filters, two fresh R1830-94 engines, 200 ampere generators, and short exhaust stacks. ☐ Goodyear Tire and Rubber Company of Canada has had Super-92 engines installed on their DC3 at Remmert-Werner in St. Louis. Don Murray is chief pilot. ☐ B. W. Sandberg brought the Greenlee Brothers DC3 to Remmert-Werner in St. Louis for installation of a Maximizer kit, propellor overhaul and annual inspection. ☐ Fred Hotson, Ken Irwin, and Andy Gabure came to Remmert-Werner of Toledo for installation on fresh Super-92 engines on the Ontario Paper Company Super-92 DC3. ☐ The Bank of Mexico has two new deluxe executive C47 from Remmert-Werner with R1830-94 engines, special custom interior, custom radio and instrument panels, Edison fire detectors, Collins, Bendix, and A.R.C. radio.

■ The Garrett Corporation's Airsearch Aviation Service Division, Los Angeles International Airport, is installing the complete Airesearch maximizer kit on Michigan-Wisconsin Pipeline Co.'s DC-3. Pilot Lloyd Bauer brought in the aircraft, which is also receiving one piece windshields on both the pilot and co-pilot's sides of the cockpit, a Janitrol 200,000 Btu heater, and a refurbishing of the entire interior.

☐ A second Convair 240 from Mohawk Airlines is at Airesearch for installation of an airstair door, fabrication and installation of a new buffet, and partial refurbishing of the interior. Mohawk Chief Engineer Edward Potter accompanied the plane.

☐ Pilot Eddie Ross, accompanied by Air Transportation Dept. Mgr. C. F. Simmerman, brought in Continental Air Co.'s Convair 340 for a 1,000-hour inspection, double-engine change, and installation of a Ranger auxiliary power unit.

■ Flight Safety, Inc., specifications are followed in the installation of Collins radar in Pickands Mather & Co. DC-3, Art Aimmer, Chief Pilot.

■ Safe Flight Speed Control was installed in Thatcher Glass Co.'s Lockheed Ventura, Torch Lewis, Pilot. Ventura was equipped by Green Air Service, Westchester for Thatcher Glass, an NBAA. member.

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Suggest Some Federal-State Highway Funds Go to Business Airstrips

A proposal to use part of the money in the multi-billion-dollar federal-state road building program to construct small airfields was made by Roscoe Turner, pioneer aviator, in the AIA publication.

In a special article on the business and utility aviation field, he pointed out that only about 1/3 of the 15,000 urban areas in this country are now accessible by air. He said there are many locations where an inexpensive complex of aerial flight strips would "reap a generous harvest" for the future of aviation and of the whole economy. Turner declared it would cost very little to construct single flight strips about 2000′ long and 150′ wide in the direction of the prevailing wind, with a surface level and firm enough to handle small aircraft.

Among the advantages he cited for combining the highway and small airport construction programs were:

1. Reduced cost because the type of machinery used for roads and airstrips is identical and the machinery would already be in use adjacent to the airfields.

2. It would be possible to acquire the small amount of land needed for the airstrips at minimum cost if it were purchased at the same time highway rights-of-way were acquired.

3. The airstrips would be invaluable not only for general aviation purposes but also as emergency fields for airline use.

4. In a civil defense emergency, every part of the country would be accessible by air even if highways and railroads were destroyed or congested.